

1-1-1905

1905-1906 Course Catalog

University of Montana--Missoula. Office of the Registrar

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Bulletin University of Montana, No. 36,
Issued Quarterly, June, 1906

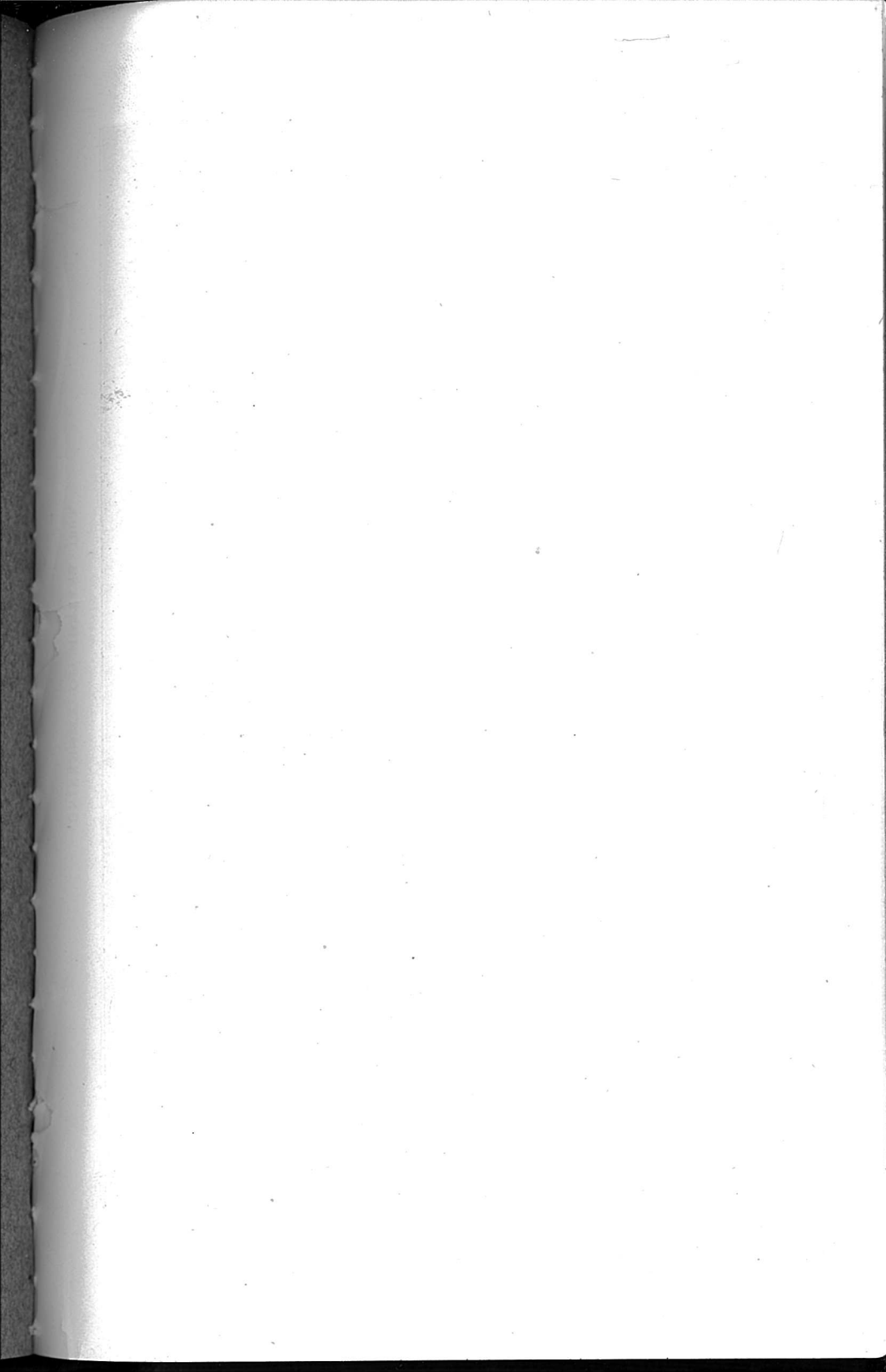
The University of Montana

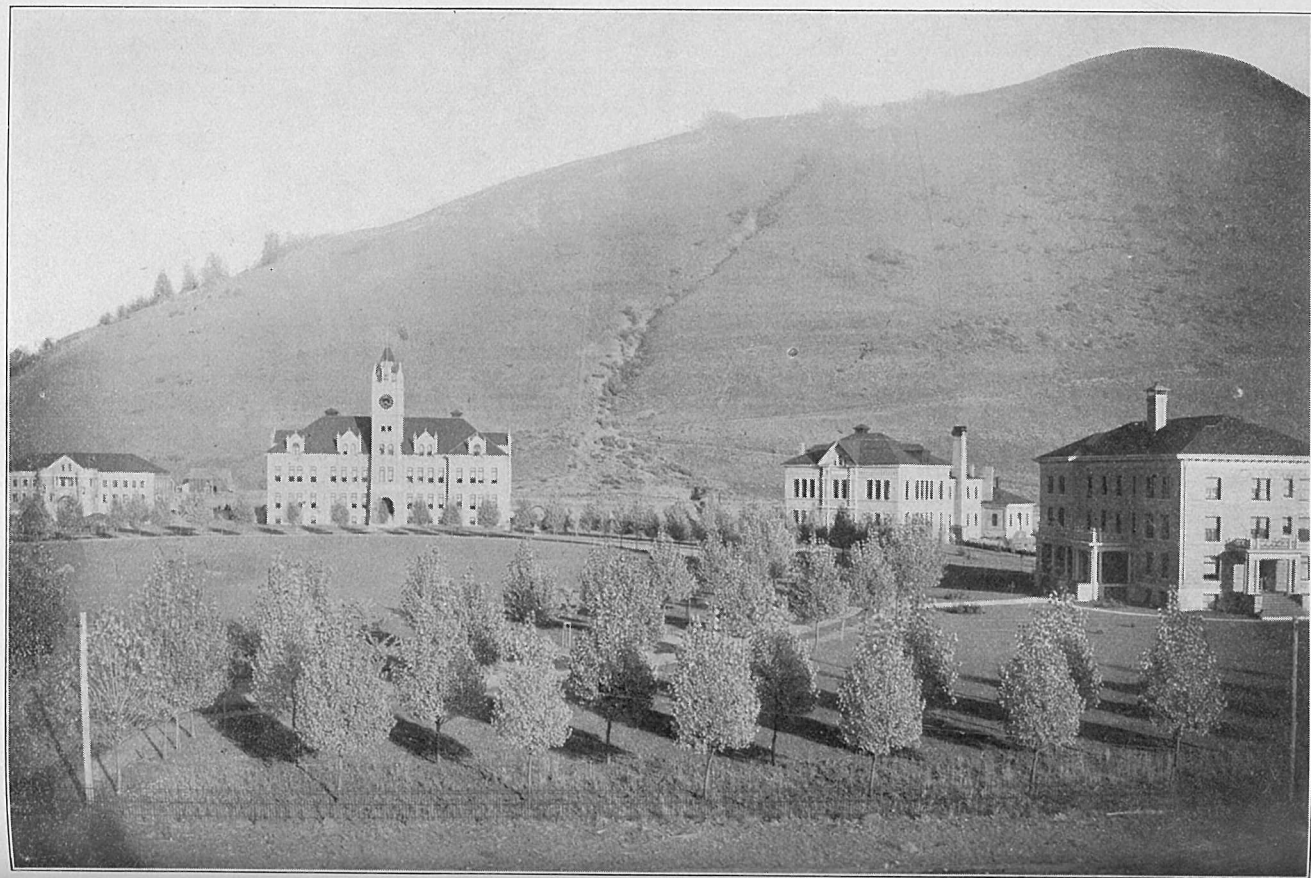


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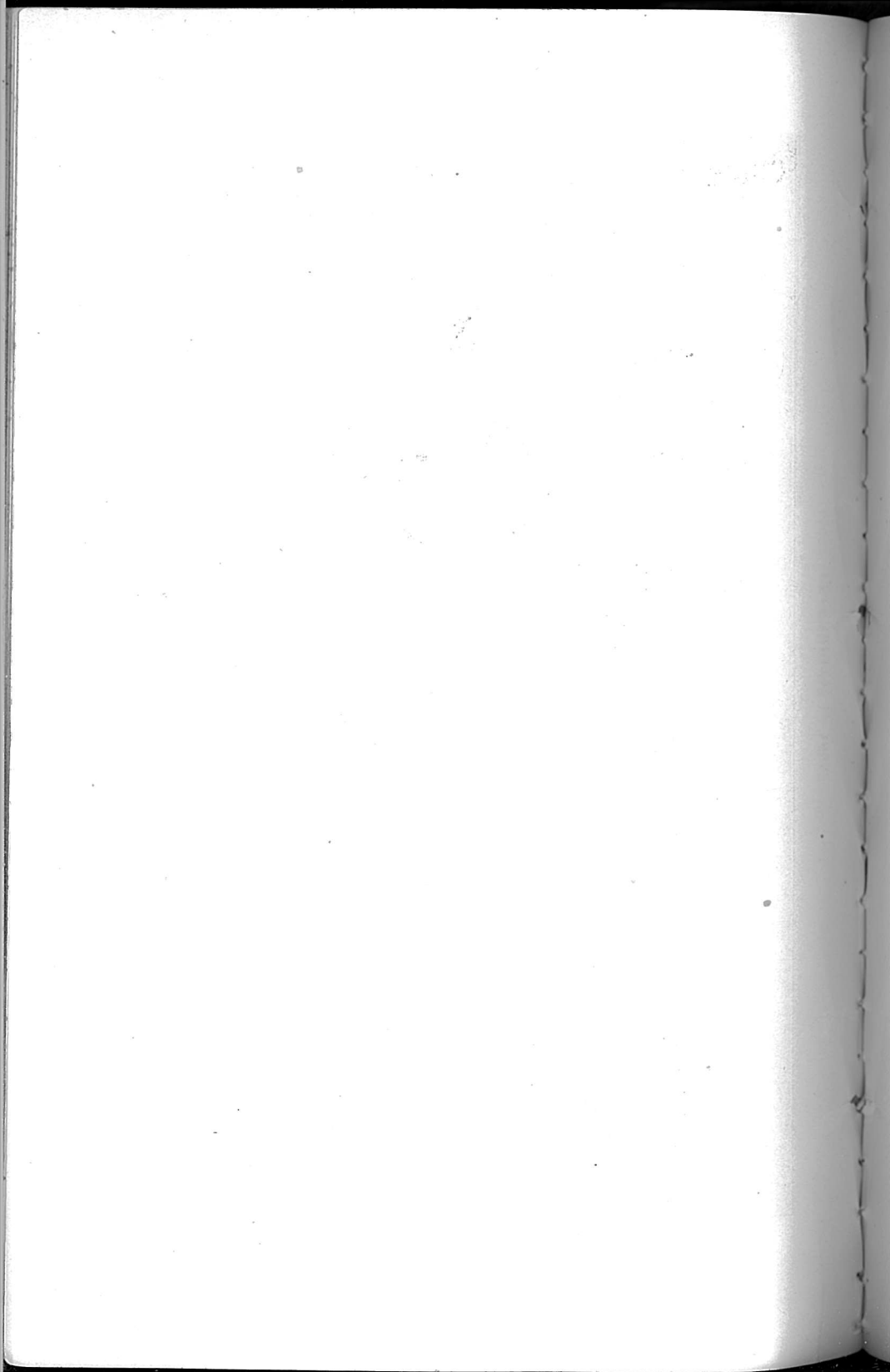




UNIVERSITY OF MONTANA 1905.



UNIVERSITY IN 1895.



THE
ELEVENTH REGISTER
OF THE
UNIVERSITY OF MONTANA
MISSOULA, MONTANA
1905-1906

WITH AN OUTLINE OF THE COURSES OF STUDY AND THE
DEPARTMENTS OF INSTRUCTION FOR
1906-1907.



HELENA, MONTANA
INDEPENDENT PUBLISHING COMPANY
1906

College Calendar for 1906—1907.

1906.

Entrance Examination, Monday, September 10.

Registration Day, Tuesday, September 11.

Instruction begins Wednesday, September 12, 8:30 A. M.

Thanksgiving Vacation begins Wednesday, November 28, 12:30 P. M.

Thanksgiving Vacation ends Monday, December 3, 8:30 A. M.

Christmas Holidays begin Friday, December 21, 4:00 P. M.

1907.

Christmas Holidays end Tuesday, January 8, 8:30 A. M.

First Semester ends Friday, February 1.

Registration Day, Second Semester, Tuesday, February 5.

Instruction begins Wednesday, February 6, 8:30 A. M.

Charter Day, Friday, February 15.

Annual Entertainment of the Clarkia Society, Friday, March 1, 8:30 P. M.

Annual Entertainment of the Hawthorne Society, Friday, March 8, 8:30 P. M.

Annual Recital, Department of Elocution and Physical Culture, Friday, April 26, 8:30 P. M.

Interscholastic Meet, Wednesday, Thursday and Friday, May 15, 16 and 17.

Prize Contest in Declamation, Preparatory Students, Friday, May 31, 8:30 P. M.

H. N. Buckley Oratorical Contest, Saturday, June 1, 8:30 P. M.

Baccalaureate Day, Sunday, June 2.

Instruction ends Monday, June 3, 4:00 P. M.

Annual Recital, School of Music, Monday, June 3, 8:30 P. M.

Class Day, Tuesday, June 4.

Annual Lecture before Literary Societies, Tuesday, June 4, 8:30 P. M.

Field Day, Wednesday, June 5.

Alumni Reunion, Wednesday, June 5, 8:30 P. M.

Commencement, Thursday, June 6, 10:30 A. M.

CALENDAR 1906-7.

1906							1907						
JULY							JANUARY.						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	1	2	3	4	5
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8	9	10	11	12	13	14	13	14	15	16	17	18	19
15	16	17	18	19	20	21	20	21	22	23	24	25	26
22	23	24	25	26	27	28	27	28	29	30	31
29	30	31	..	..	..	..	..	..	..	..	..	..	..
AUGUST.							FEBRUARY.						
..	..	..	1	2	3	4	..	..	..	..	1	2	3
5	6	7	8	9	10	11	3	4	5	6	7	8	9
12	13	14	15	16	17	18	10	11	12	13	14	15	16
19	20	21	22	23	24	25	17	18	19	20	21	22	23
26	27	28	29	30	31	..	24	25	26	27	28	..	..
..
SEPTEMBER.							MARCH.						
..	..	..	..	..	..	1	..	..	..	..	1	2	3
2	3	4	5	6	7	8	3	4	5	6	7	8	9
9	10	11	12	13	14	15	10	11	12	13	14	15	16
16	17	18	19	20	21	22	17	18	19	20	21	22	23
23	24	25	26	27	28	29	24	25	26	27	28	29	30
30	31
OCTOBER.							APRIL.						
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7	8	9	10	11	12	13	7	8	9	10	11	12	13
14	15	16	17	18	19	20	14	15	16	17	18	19	20
21	22	23	24	25	26	27	21	22	23	24	25	26	27
28	29	30	31	28	29	30
NOVEMBER.							MAY.						
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4	5	6	7	8	9	10	5	6	7	8	9	10	11
11	12	13	14	15	16	17	12	13	14	15	16	17	18
18	19	20	21	22	23	24	19	20	21	22	23	24	25
25	26	27	28	29	30	..	26	27	28	29	30	31	..
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DECEMBER.							JUNE.						
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9	10	11	12	13	14	15	9	10	11	12	13	14	15
16	17	18	19	20	21	22	16	17	18	19	20	21	22
23	24	25	26	27	28	29	23	24	25	26	27	28	29
30	31	..	..	..	..	..	30	..	..	..	..	..	..

The Faculty.

OSCAR J. CRAIG, A. M., Ph. D.,
President.

University Place, University Avenue.

CYNTHIA ELIZABETH REILEY, B. S.,
Professor of Mathematics.
Woman's Hall, University Grounds.

W. M. ABER, A. B.,
Professor of Latin and Greek.
No. 26, Hammond Block.

FREDERICK C. SCHEUCH, B. M. E., A. C.,
Professor of Modern Languages and Secretary of the Faculty.
309 South 5th St., East.

MORTON J. ELROD, M. A., Ph. D.,
Professor of Biology.
205 South 5th St., East.

FRANCES CORBIN, B. L.,
Professor of English Literature,
302 South 6th St., East.

WILLIAM D. HARKINS, A. B., Ph. D.
Professor of Chemistry.
521 East Pine.

JESSE P. ROWE, M. A., Ph. D.
Professor of Physics and Geology.
118 South 4th St., West.

ROBERT SIBLEY, B. S.,
Professor of Mechanical Engineering.
South 3d St., West.

WILLIAM F. BOOK, Ph. D.,
Professor of Psychology and Method.
124 South 5th St., West.

ELOISE KNOWLES, Ph. B.,
Instructor in Drawing.
South 2nd St., West.

MRS. BLANCHE WHITAKER,
Director, School of Music.
322 South 5th St., East.

RUTH ELISE KELLOGG,
Instructor in Elocution and Physical Culture.
310 South 5th St., East.

JAMES S. SNODDY, A. M.,
Professor in English and Rhetoric.
212 South 5th East.

FRED W. SCHULE, A. B., A. M.,
Director of the Gymnasium.
University Ave.

ALICE YOUNG, Ph. B.,
Dean of Women,
Woman's Hall, University Grounds.

ANNA F. CARTER, B. S.,
Assistant in Preparatory School.
Woman's Hall, University Grounds.

RALPH GILHAM,
Laboratory Assistant in Chemistry.

JOSIAH MOORE,
Laboratory Assistant in Biology.

JOSEPH W. STREIT,
Laboratory Assistant in Physics.
South 5th St., West.

FRED. BUCK,
Laboratory Assistant, Mechanical Engineering.

GERTRUDE BUCKHOUSE, B. S.,
Librarian.
Woman's Hall, University Grounds.

COMMITTEE ON GRADUATE WORK—The President, Elrod, Reiley, Scheuch, Snoddy.

COMMITTEE ON GRADING AND CLASSIFICATION—The President, Aber, Elrod, Reiley and Scheuch.

COMMITTEE ON EXAMINATIONS—Aber, Knowles, Young.

COMMITTEE ON STUDENT AFFAIRS—The President, Rowe, Corbin, Scheuch, Harkins.

COMMITTEE ON ATHLETICS—Schule, Sibley, Kellogg.

COMMITTEE ON PUBLIC PERFORMANCES—Snoddy, Kellogg, Corbin.

The Montana State Board of Education.

EX-OFFICIO.

GOVERNOR JOSEPH K. TOOLE, President.

ALBERT J. GALEN, Attorney General.

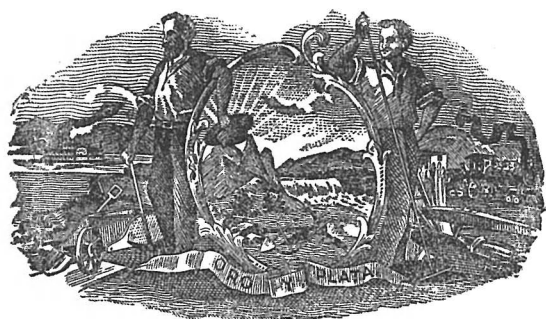
W. E. HARMON, Supt. Pub. Instruction, Secretary.

APPOINTED.

JOHN M. EVANS, Missoula.....	Term Expires February 1, 1906
CHARLES R. LEONARD, Butte.....	" " " 1, 1906
N. W. McCONNELL, Helena.....	" " " 1, 1907
E. O. BUSENBERG, Lewistown.....	" " " 1, 1907
O. P. CHISHOLM, Bozeman.....	" " " 1, 1908
S. D. LARGENT, Great Falls.....	" " " 1, 1908
CHAS. N. KESSLER, Helena.....	" " " 1, 1909
G. T. PAUL, Dillon.....	" " " 1, 1909
B. T. HATHAWAY.....	Clerk of the Board

EXECUTIVE COMMITTEE OF THE STATE UNIVERSITY.

J. H. T. RYMAN, President.....	Missoula
T. C. MARSHALL, Secretary.....	Missoula
HIRAM KNOWLES.....	Missoula



The University and its Endowment.

The University of Montana was created by an act of the Montana State Legislature, approved February 17, 1893. The following extracts give the title of the act, and also certain sections that indicate the purpose of the University and the scope of its work.

"An Act to establish, locate maintain, and govern the University of the State of Montana.

Section 1. "There is hereby established in this State at the City of Missoula an institution of learning under the name and style of the University of Montana."

Section 6. "The object of the University of Montana shall be to provide the best and most efficient manner of imparting to young men and young women on equal terms, a liberal education and a thorough knowledge of the different branches of Literature, Science and the Arts, with their varied applications; and to this end there shall be established the following colleges or departments, to-wit:

First—A Preparatory Department.

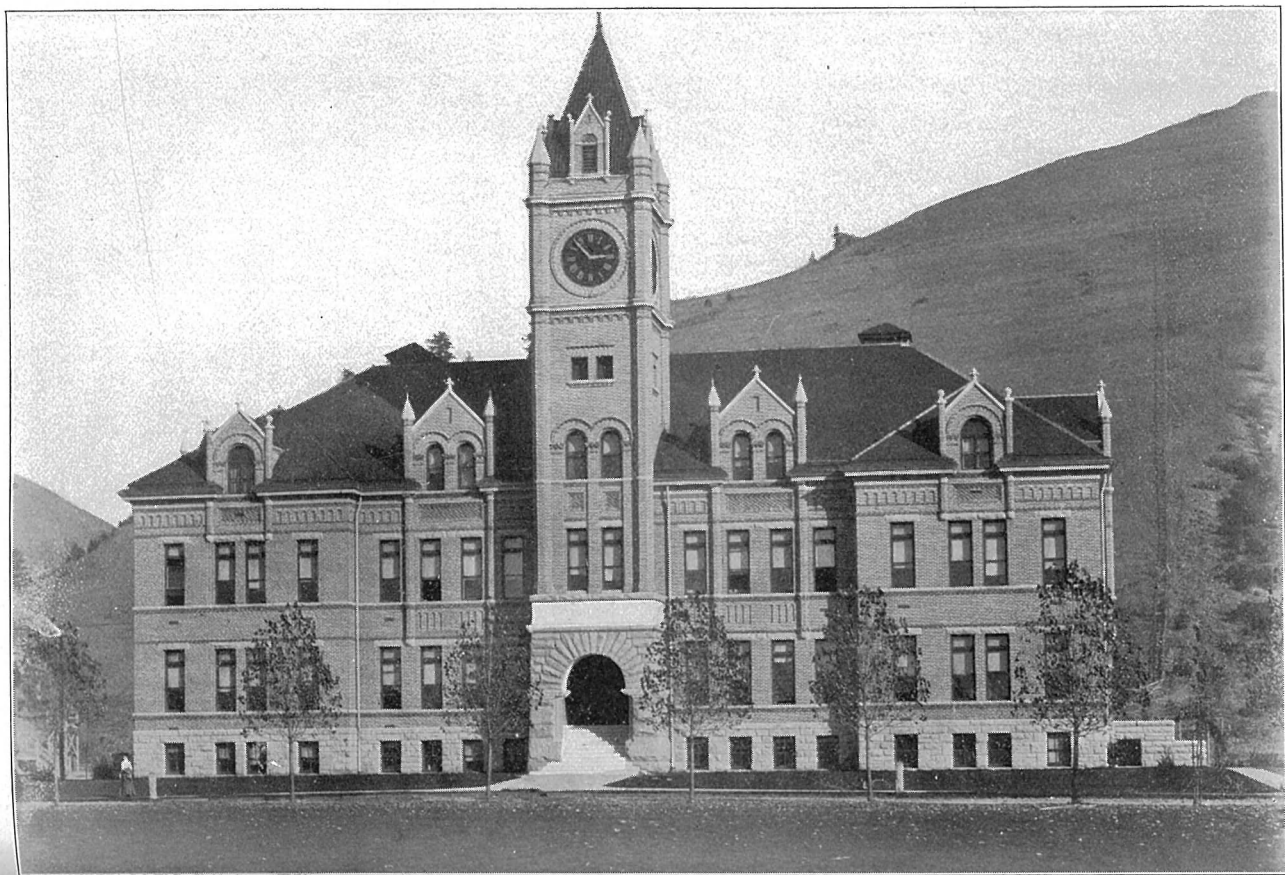
Second—A Department of Literature, Science and the Arts.

Third—Such professional and technical colleges as may from time to time be added to or connected therewith.

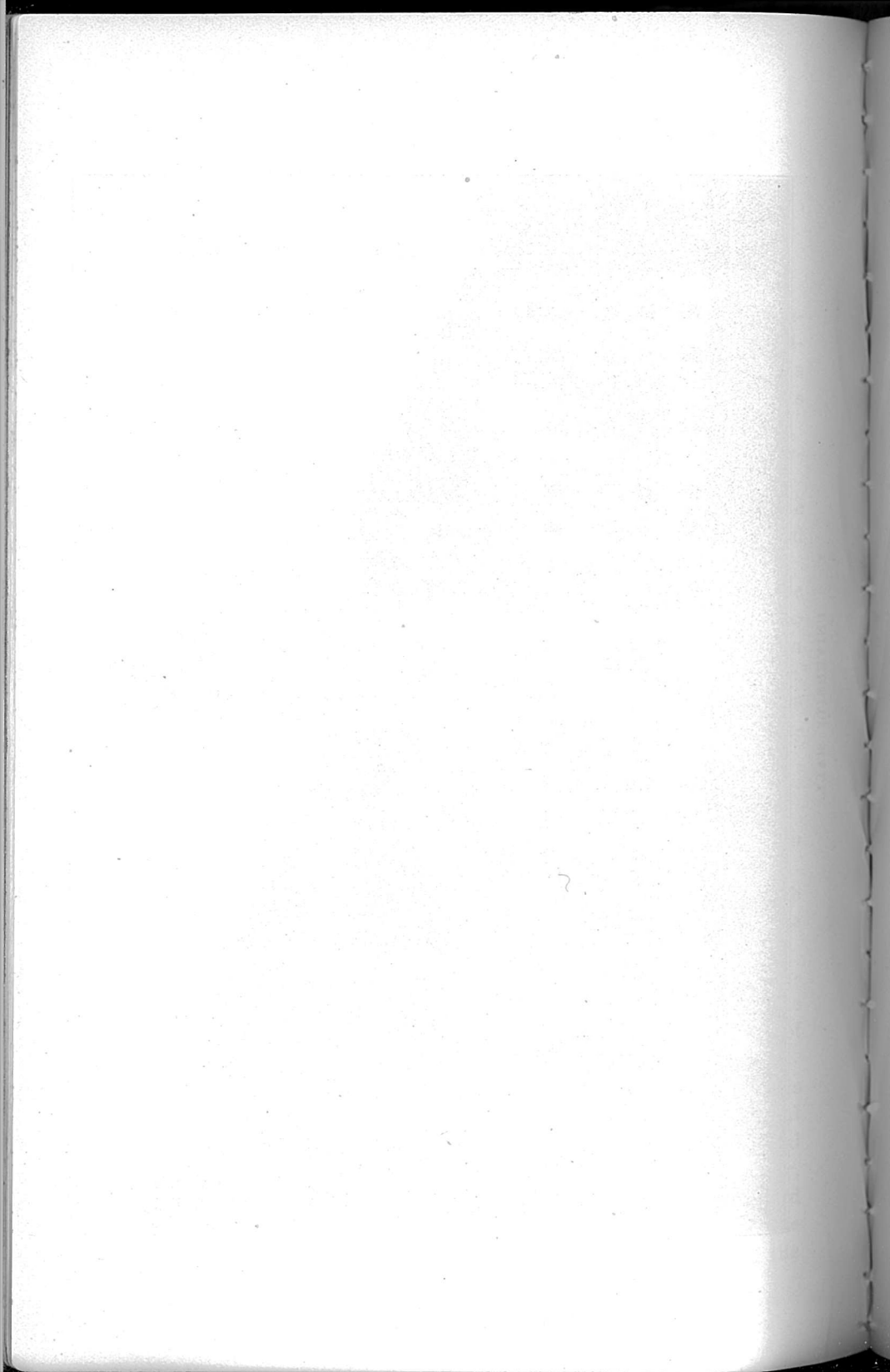
The Preparatory Department may be dispensed with at such date and in such wise as may seem just and proper to the State Board of Education.

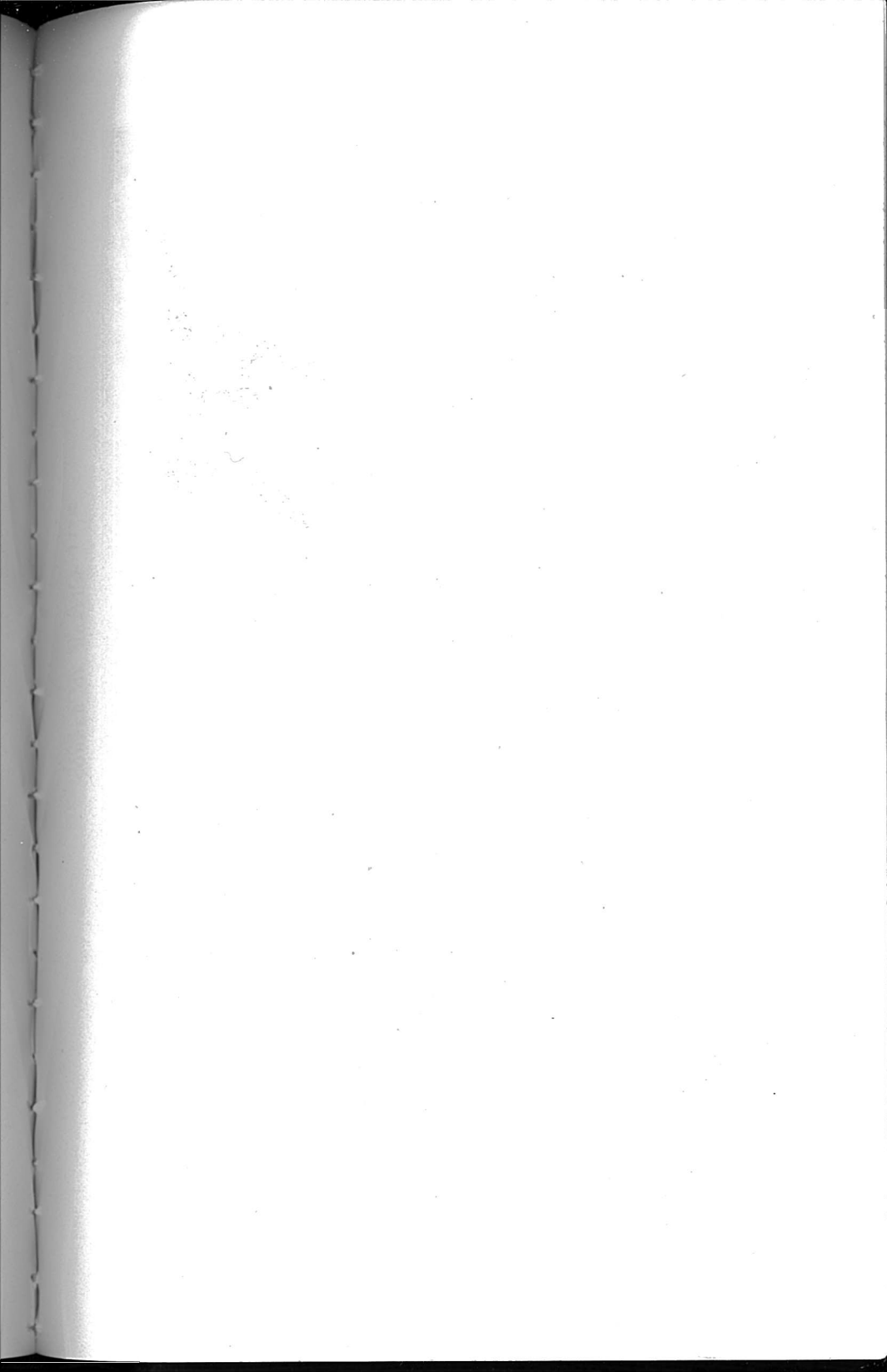
Section 7. "Such duties or courses of instruction shall be pursued in the Preparatory Department as shall best prepare the students to enter any of the regular colleges or departments of the University."

"The college or department of Literature, Science and the Arts shall embrace courses of instruction in Mathematical, Physical and Natural Sciences with their applications to the Industrial Arts; a liberal course of instruction in the Languages, Literature, History, Philosophy, and such other branches as the State Board of Education may prescribe. And, as soon as the income of the University will allow, and in such order as the demands of the



UNIVERSITY HALL.



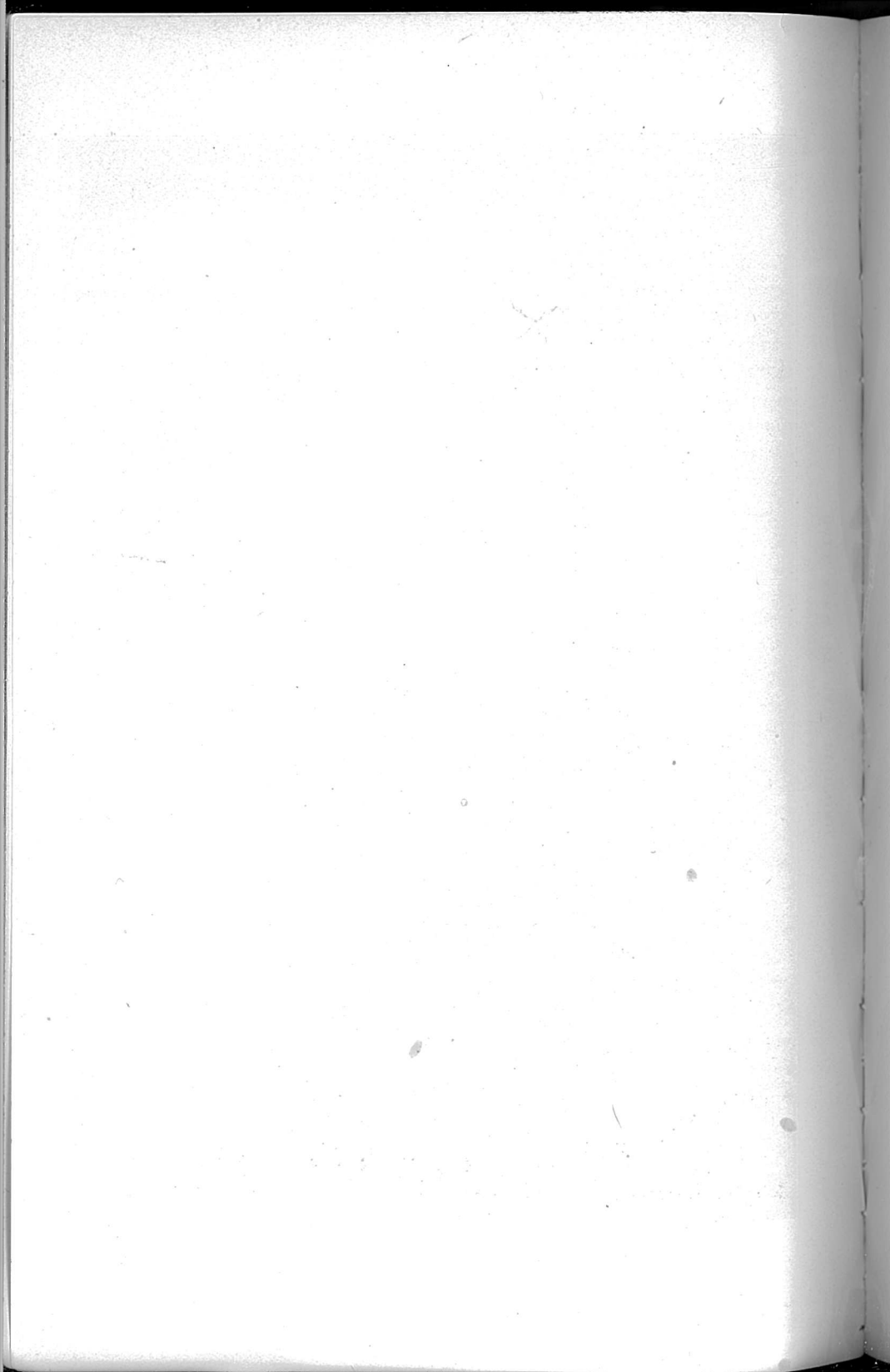




CORNER OF MUSEUM.



HALL VIEW IN MAIN BUILDING.



public seem to require, the said courses of instruction in the Sciences, Literature and the Arts shall be expanded into distinct colleges or departments of the University, each with its own faculty and appropriate title."

Section 9. "Tuition shall ever be free to all students who shall have been residents of the State for one year preceding their admission; except in the Law and Medical Departments, and for extra studies. The State Board of Education may prescribe rates of tuition for any student in the Law or Medical Department, or who shall not have been a resident as aforesaid, and for teaching such studies."

ENDOWMENT.

Section 11. "For the support and the endowment of the University there is annually and perpetually appropriated—

"First—The University Income Fund and all other sums of money appropriated by law to the University Income Fund.

"Second—All tuition and matriculation fees.

"Third—All such contributions as may be derived from public or private bounty .

Section 10. "Any person contributing a sum not less than fifteen thousand dollars (\$15,000) shall have the privilege of endowing a professorship in the University, or any department thereof, the name and object of which shall be designated by the State Board of Education."

By an act of Congress dated February 18, 1892, 46,080 acres of land were donated to the State of Montana for University purposes. This land was granted by the Federal Government upon condition that the proceeds from the sale of such lands should become a permanent University fund.

The Income Fund arises from the rental of lands unsold, from licenses to cut trees and from the interest on the proceeds of the sale of lands invested in the permanent University fund. This fund has been applied to the payment of the interest on bonds, which were issued in 1897 and 1902 for the construction and equipment of buildings.

The University lands have all been selected. They comprise some of the best lands in the state and are rapidly increasing in value.

Description of Campus and Buildings.

THE UNIVERSITY CAMPUS.

The University Campus is forty acres in extent, and lies near the southeastern limit of the City of Missoula, at the base of the hills which enclose the eastern end of the valley. To the north lies the Missoula river; westward stretches a wide plain, whose western and southern horizons are bounded by the Bitter Root Mountains. A substantial beginning has been made toward the improvement of the campus. A double row of trees was planted along the north, west and south sides nine years ago. Near the center an oval lawn of about three acres in extent is marked out by a broad graveled driveway; around this is a side-walk, with a space between the walk and the driveway for grass, flowers and shrubbery. The entrance to this driveway is at the western side, from University avenue.

A double row of trees is planted around the drive, one on the lawn around the inner edge of the drive, the other on the outer side of the walk. The trees and the lawns started around the building and within the oval have made an excellent growth and already present a beautiful appearance.

BUILDINGS.

University Hall, the largest building, stands on the east side of the oval, directly opposite the entrance to the driveway, facing the west. A little to the south stands Science Hall, which faces toward the northwest, and like University Hall, fronts upon the oval.

University Hall is 140 by 65 feet in its ground dimensions, and its central tower rises to a height of one hundred and twelve feet. This building has four floors, including the basement, which is so largely above the ground as to be well lighted and fit for any sort of use. The basement walls are of granite; above rise double brick walls of the most substantial character; the inner partition walls are also of brick.

Throughout the building from basement upwards is a uniform handsome finish of dark tamarack and white pine wainscoting, in alternate strips; above this are white plaster walls.

Every room is connected with a large ventilating shaft whose outlet is above the roof. The steam-heated radiators are fitted

with a cold air box, whose connections with the outer air through the walls of the building can be opened and closed at pleasure. When these are open, fresh air is drawn into the room through the radiator, while the air of the room is drawn out through the ventilating shafts. This ventilating arrangement, while simple and inexpensive, is found to be efficient. Ample heat is furnished by the steam plant in Science Hall. The three essential requirements, light, heat and ventilation are well supplied.

The basement has a wide hallway running through it between the north and south entrances, with rooms on each side. This hall is divided in the center by a partition, which separates the whole basement into a northern and southern half, whose sole connection is the door thorough this partition. The northern half contains two small storerooms, now used by the Library, a fire-proof vault, a cloak room and a toilet room for women. The southern half contains a photographic dark room, a toilet room for men and three large rooms, used at present as storage and work rooms for the Museum and for the Departments of Biology and Geology.

From each half of the basement a stairway rises to the first floor. This floor, like the basement is divided lengthwise by a broad hallway, extending between north and south entrances. The main entrance to the building, through the tower at the center of the western front, opens into this hallway. The center of the eastern half of the floor, all that part lying between the northern and southern stairways, is occupied by the Library, which also furnishes a reading and study room.

At the southeastern corner of the floor is the Museum. The western half of the floor contains, in the southern part, the laboratory and lecture room of the Biological Department, and in the northern part, the President's office and a room for the use of the Faculty and its Secretary.

The central part of the second floor is occupied by the Assembly Hall, a room of fine proportions and simple but elegant adornment. In height it rises through two stories, and has a gallery whose entrances are on the level of the third floor. The main floor of the hall is seated with about 300 opera chairs, and the gallery will accommodate about 150.

The second floor has three rooms on each side of the Assembly

Hall. On the northern side are the rooms for Mathematics and Modern Languages, to the latter of which is attached a smaller recitation room. On the southern side are rooms for Literature and Ancient Languages and a smaller recitation room.

The central part of the third floor is occupied by the gallery of the Assembly Hall; north of this is a large room for the literary societies and a recitation room; south of the gallery is a large room for the Art department, which extends along the whole southern end of the building; adjacent to this is a smaller room, used for storage.

The whole building contains thirty-one rooms, without including six small rooms in the rear of the Assembly Hall—three on the second and three on the third floor. These rooms furnish a passageway from one end of the building to the other, without going through the Assembly Hall, and may also serve as cloak rooms; those on the second floor give access from the rear to the platform of Assembly Hall.

The most important of these rooms in University Hall are the Assembly Room, Library, Museum, Literary Society Hall, Offices, Biological Laboratory and seven lecture rooms of uniform size, for the departments of History, Drawing, Biology, Mathematics, Literature, Modern Languages and Ancient Languages.

Science Hall contains in the first floor eight rooms; a lecture room and laboratory for the Department of Physics; and an office, a drawing room, a wood working shop, a machine shop, a forge room and a foundry room for the Department of Mechanical Engineering.

On the second floor are eight rooms: for the Department of Chemistry, a lecture room, an office and private laboratory, a stock room, a department library and balance room, a laboratory for advanced chemical work and one for elementary chemical work; and two rooms devoted to the Department of Geology and Mineralogy.

In the basement are the boilers for the heating plant of all the buildings and the engine which runs the machinery of the shops.

The Woman's Hall stands on the south side of the oval. This building was constructed to furnish a home for students. It is 136 by 46 feet in its ground dimensions and has four floors, including the basement, which is so largely above ground as to be well lighted and fit for any use.

In the basement are the dining room, laundry room, storage rooms, etc. The first floor contains the office, parlors and some students' rooms. The second and third floors are entirely devoted to students' rooms. On each floor are closets and bath rooms. The entire building is well furnished and amply supplied with electric lights, steam heat and every sanitary convenience. It is designed to accommodate 72 students.

The Gymnasium, north of University Hall, is 114 by 58 feet in its ground dimensions. The main, unbroken, gymnasium floor is 114 by 43 feet. In the rear of this are the dressing and bath rooms for men and for women. These are supplied with hot and cold water, and the building is lighted by electric lights and heated with steam radiators. In the rear of the building, facing the track and athletic grounds, is a commodious and comfortable grand stand.

The Library.

The general library and reading room occupies a large, well lighted room on the first floor of University Hall. Special collections are shelved in separate rooms.

The system of department libraries prevails to a limited extent, small collections of books specially needed in connection with laboratory and class room work being deposited in several departments.

The Library is open six days in the week. From Monday until Friday, the hours are from 8:30 a. m. to 4:30 p. m.; Saturday from 9 a. m. to 12 noon.

Students are allowed free access to the shelves. The following are the rules governing the Library and Reading Room:

1. The Library shall be open for reading and study at such hours as the Faculty may prescribe, and in these hours conversation, or other conduct which may divert attention or otherwise annoy, shall not be allowed.

2. Any one wishing any book or periodical (dictionary excepted) must apply to the Librarian for it; and (if the book is not regularly drawn out) must return it to the Librarian before leaving the room.

3. Books not marked "Reference Book" may be drawn from

the Library and retained one week, and then may be redrawn for another week; but no books may be kept by one person longer than two weeks.

4. If a book is not returned within the week for which it was drawn, the holder shall be subject to a fine of 10 cents; if not returned within two weeks from the time it was drawn, a fine of 25 cents; if not returned within a month, a fine equal to the price of the book.

5. Reference books, current periodicals and papers cannot be taken from the library room except by special permission of the Librarian, and then only from the closing of the Library to the first succeeding hour of opening .

6. A violation of any of the foregoing regulations, or other rules which may from time to time be prescribed, may forfeit a student's right to the use of the Library for such time as may be designated.

7. No student may have in possession from the Library at any one time in any one line of work more than two books, except that the Librarian may in special cases allow additional volumes to be drawn on the recommendation of the professor in charge.

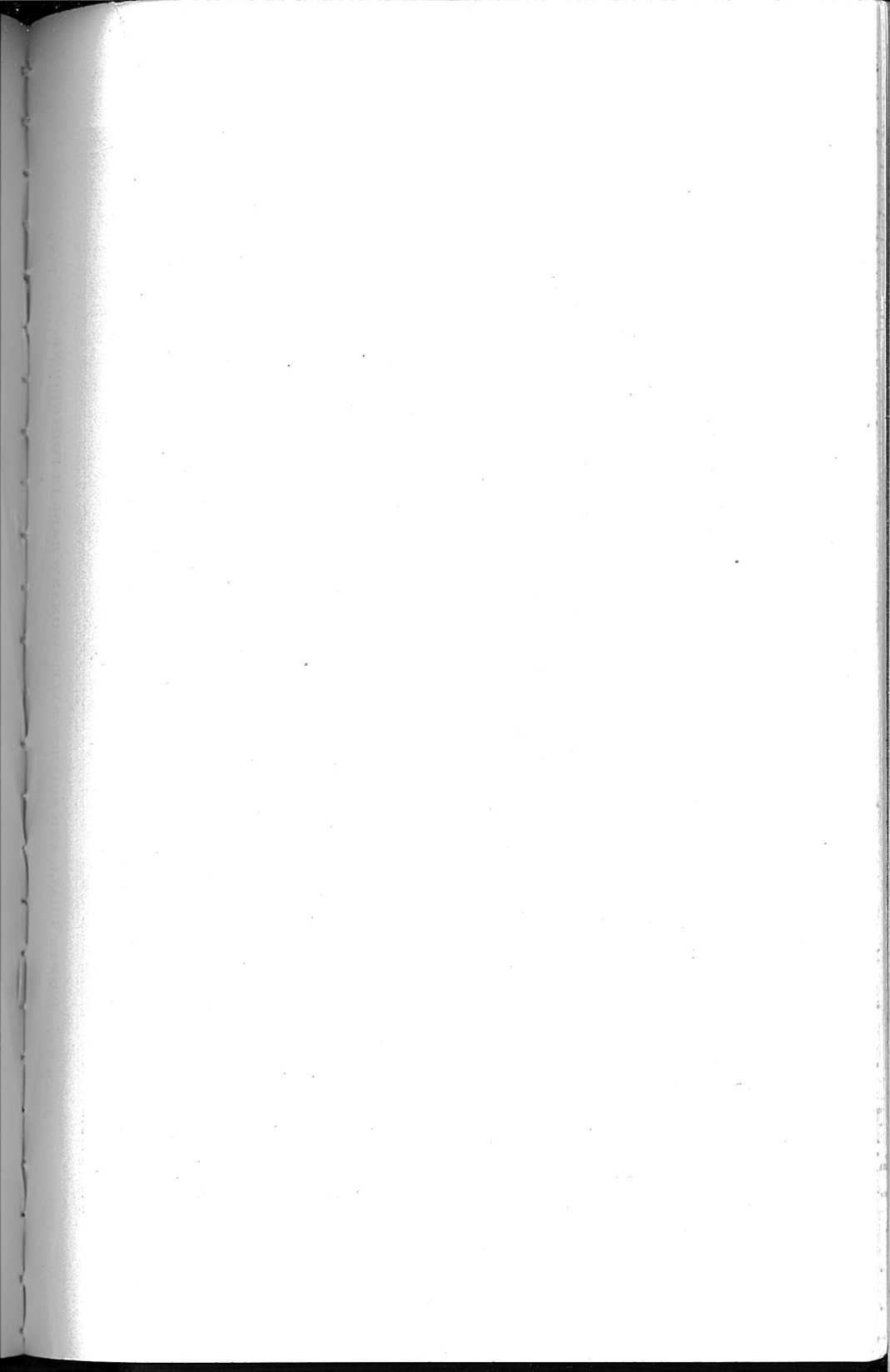
8. It is the duty of the Librarian to enforce the above regulations.

The following is a list of the periodicals on file for the use of members of the University:

- American Architect.
- American Chemical Journal.
- American Electrician.
- American Geologist.
- American Journal of Science.
- American Journal of Physiology.
- American Machinist.
- American Naturalist.
- American Physical Educational Review.
- Analyst.
- American School Board Journal.
- Analytische Chemie Zeitschrift Fur.
- Annals and Magazine of Natural History.
- Anorganische Chemie, Zeitschrift Fur.
- Anorganischen Chemie.
- Archaeology.
- Associated Engineering Societies Journal of.

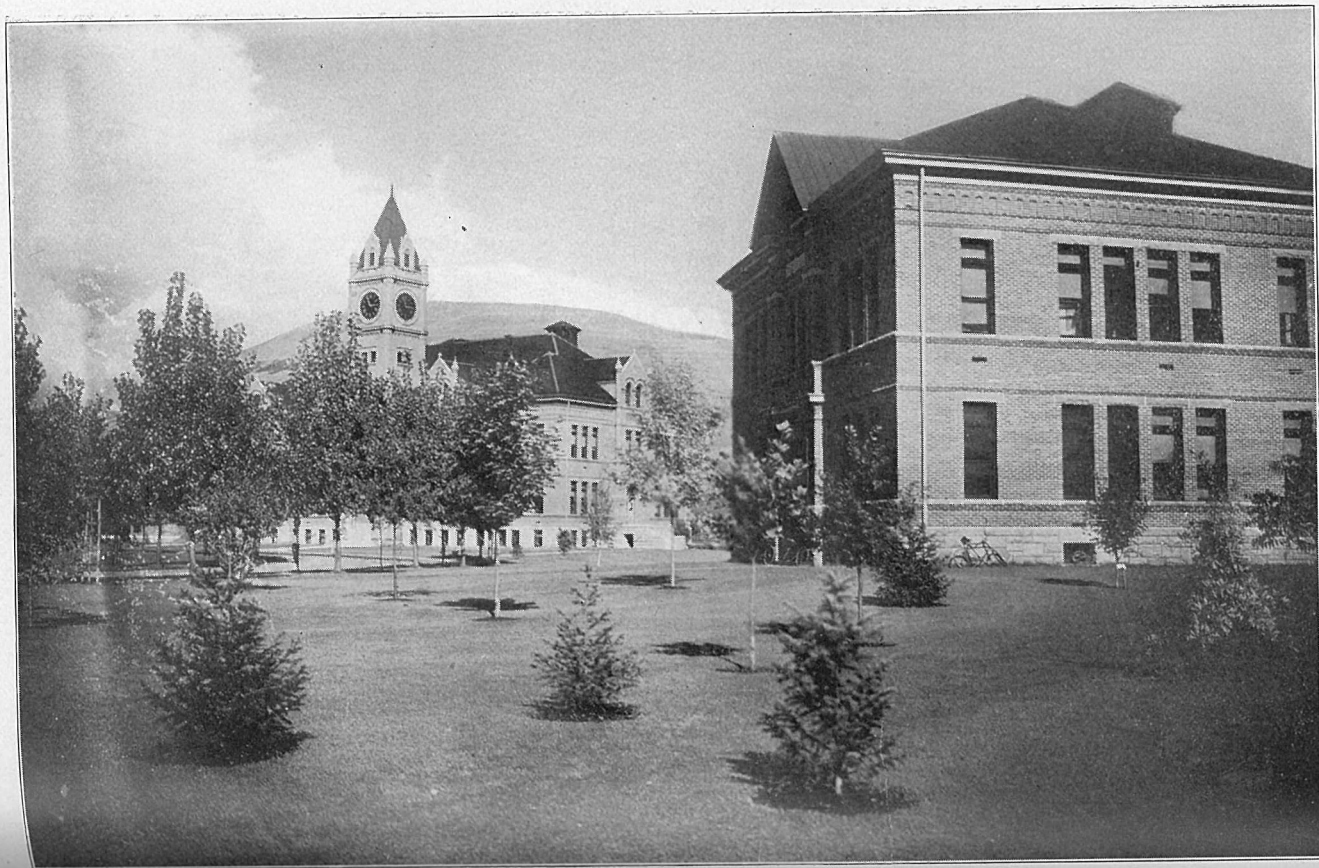
Athenaeum.
Atlantic Monthly.
Auk.
Bird-Lore.
Book Buyer.
Bookman.
Botanical Gazette.
Brick.
Brush and Pencil.
Cassier's Magazine.
Century.
Chautauquan.
Chemisches Central Blatt.
Chemisches Societe de Paris.
Classical Journal.
Classical Philology.
Classical Review.
Cosmopolitan.
Craftsman.
Critic.
Current Literature.
Deutsche Rundschau.
Dial.
Economic Biology.
Education.
Educational Review.
Engineering (London).
Engineering Magazine.
Engineering News and American Railway Journal.
Engineering and Mining News.
Entomological News.
Fels zum Meer.
Fliegende Blatter.
For California.
Forest and Stream.
Foundry.
Genera Insectorum.
Gute Kamerad.
Harper's Magazine.
Harper's Weekly.
Illinois Staats Zeitung.
Independent Studio.
Journal of American Chemical Society
Journal of Chemical Society (London).
Journal of Geology.
Journal of Sociology.
Journal of the Royal Microscopical Society

Ladies' Home Journal.
Library Journal.
Literary Digest.
Literary World.
Living Age.
Literary News.
McClure's.
Masters of Art.
Mathematics.
Mind and Body.
Mines and Minerals.
Mining World.
Monist.
National Geographic Magazine.
Nature .
Die Naturlichen Pflanzenfamilien.
Nautilus.
Neurology, Comparative.
N. Y. Botanical Garden.
Nineteenth Century.
North American Review.
Ornithology, American.
Outing.
Outlook.
Photographic Times (Bulletin).
Physical Review.
Plant World.
Poet Lore.
Political Science Quarterly.
Popular Science Monthly.
Power.
American Journal of Psychology.
Journal of Philosophy, Psychology and Scientific.
Methods.
Public Libraries.
Public Opinion.
Public Library Quarterly.
Public School Journal.
Publisher's Weekly.
Queen's Quarterly.
Railway and Locomotive Engineering.
Reader's Guide to Periodical Literature.
Review of Reviews.
School and Home Education.
School of Mines Quarterly.
School Review.
Science.
Scientific American and Supplement.





WOMAN'S HALL AND SCIENCE HALL. WOMAN'S HALL IN FOREGROUND.



UNIVERSITY HALL.

SCIENCE HALL.

Scribner's.
Success.
Torrey Botanical Club.
Torreya.
Über Land und Meer.
Western Homeseeker.
World's Work.
Zeitschrift für Wissenschaftliche Mikroskopie.
Zoologischer Anzeiger.
Zoologist.
Anaconda Standard.
Helena Independent.
Butte Miner.

The following papers are donated by their respective publishers:

Belt Valley Times.
The Big Timber Pioneer.
The Yellowstone Leader, Big Timber.
The Billings Times.
The Sentinel, Boulder.
The Avant-Courier, Bozeman.
The Tribune-Review, Butte.
The Butte Evening News.
The Butte Inter Mountain.
The Reveille Butte.
The Chinook Opinion.
The Dillon Examiner.
The Dillon Tribune.
The Forsyth Times.
The Glendive Independent.
The Western News, Hamilton.
The Ravalli Republican, Hamilton.
The Basin Progress.
The Butte Inter Mountain.
Valley County News, Glasgow.
The Havre Herald.
The Havre Plaindealer.
The Kalispell Bee.
The Inter-Lake, Kalispell.
The Montana Daily Record.
The Independent, Miles City.
The Madison County Monitor.
Madisonian.
The Philipsburg Call.
Pony Sentinel.
The Rocky Mountain Husbandman.
The Silver State.

The Stevensville Register.
The Northwest Tribune, Stevensville.
River Press, Fort Benton.
Rosebud County News.
The Choteau Acantha.
Rocky Mountain Leader.

STATEMENT.

Number of volumes in the Library	18,000
Number of pamphlets	7,243
Number of periodicals regularly received	168

The Museum.

The Rooms—The Museum proper is on the first floor of the main building. One room in the basement is allotted for storage of the collections, and is packed full. The Museum is filled with cases, along the walls and in the interior. The cases are made of native lumber after the best patterns, and display the collections to advantage. The walls are covered with insect cases containing mounted insects. Above the cases toward the ceiling are arranged the agricultural exhibits received from the Omaha Exposition, the large mounted fishes, collected and donated by Mr. R. A. Eddy, and the mounted birds of large size.

The Geological and Biological storeroom in connection with the Museum, is located in the basement of University Hall and has for the storing of specimens shelves built on the four walls. These shelves are almost entirely filled. Part of this valuable storeroom collection has been named and catalogued, but owing to lack of space in the Museum proper very little has been put out. However, as soon as more room is offered the Museum will have a showing second to none in the Northwest.

The Museum material not stored in the room set apart for the collections is housed in the different departments. Indeed much of it is indispensable to department work. As a result much of the Museum is scattered. Considering the time during which material has been gathered and the amount expended, the collections have made remarkable growth.

The intention is to make the Museum a depository of the material representing the natural, mineral and scientific wealth of the state.

COLLECTIONS.

The collections of the Museum, from various sources, are as follows: A collection of over a thousand bird skins, almost entirely from the state; a collection of shells, partly collected in the state, and partly through donations from several sources; a collection of plants, embracing about 3,000 species, with many thousand duplicates, received largely through donations, by collecting, and from the exhibit at Omaha; a collection of insects, partly through purchase, but largely by collecting; a collection of fossils, almost entirely from the state, partly donated and for the remainder collected; a collection embracing money, historical relics, souvenirs and promiscuous articles; a collection of fishes, partly from the U. S. Fish Commission, the remainder collected in the state; a collection of fresh water entomostraca from the lakes and rivers of Montana; a collection embracing coals, rocks, concentrate samples, building stones, brick, tile and pottery, developed and produced in the state; a set of the series of educational rocks prepared by the U. S. Geological Survey; the Wiley collection of over a thousand species of lepidoptera.

During the past year much work has been done on the Museum collections. Many hundreds of insects have been arranged permanently in Comstock insect cases, more than a hundred of these cases being now required to house the collection, with a large number as yet in papers.

Drawer space has been arranged for the collection of bird skins, now numbering more than a thousand, and the collection is now systematized so as to be accessible for any species.

Many hundreds of botanical specimens have been mounted, and all the identified Montana specimens have been systematically arranged in the case made especially for the collection, and are easily accessible. This work is being continued as fast as possible.

A shipment of glassware has been received from a German firm for displaying the alcoholic material that has accumulated and is not placed on exhibition. The containers are square boxes, with lids ground to fit. The boxes display the material to the best advantage, without the distortion so noticeable in round containers. The material already placed in these boxes makes a handsome exhibit.

A supply of paper-lined paste-board trays is kept on hand, and

the various collections as they come in are placed in these neat trays, are properly labeled, and are shown to the best advantage.

It is most earnestly requested that all who are interested in the University, and especially in the preservation of valuable material for scientific work, should take special pains to contribute to the material in the Museum. Time and circumstances are fatal to nearly all specimens, but being properly cared for and placed in the Museum of the University they will be preserved.

The University has come into possession of the insect collection of the late C. A. Wiley of Miles City. It embraces over a thousand specimens of Lepidoptera. Most of these are from the eastern end of the state, but many obtained by exchange. It is thus rich in native species from the state, and at the same time has many of the showy forms from Europe and the Orient. This is a great addition to the entomological collection of the University, and together with those gathered from other sources gives the University an excellent exhibition of lepidoptera, as well as a fine series for student study.

Correspondence is solicited concerning material which may be donated. All donations will be properly acknowledged, and the articles properly labelled and the donor's name recorded.

Collegiate Departments of Instruction.

Note—Roman numerals indicate the number of the course; Arabic indicate the number of recitations per week. Courses extend through one semester.

Department of History and Economics.

GENERAL INFORMATION.

The aim of this department is to give (1) a thorough knowledge of the life and institutions of the nations studied; (2) to make the student familiar with the best literature of the epochs treated as embodied in the works of the great historians; (3) to furnish a training in historical method and research through the study of sources. The library method of teaching history, supplemented by lectures and tests, is followed in all classes. Daily use is made of standard histories for reference. The thesis work is done mainly by the study of such sources as the original documents of treaties, laws and proclamations, speeches and debates of contemporaries, personal memoirs and journals, official reports, museum collections, pictures, etc. The material in the University Library is ample for all courses offered. Much source material is available, including collections of documents, personal journals, etc. The government and other official publications are catalogued and easily accessible. Such standard works are provided in American history as those of Bancroft, Winsor, Parkman, Von Holst, Fiske, MacMaster, the Elliot Debates, the Johns Hopkins Studies, etc. In European history are found the complete works of Grote, Gibbon, Duruy, Hume, Macaulay, Froude, Stubbs, Hallam, Guizot, Theiers, Lamartine, Taine, Carlyle, Motley, Menzel, Rambaud, etc. Economics is taught by the historical method and especial attention is given to those subjects which directly relate to the social and industrial life of the people. Instruction is made practical by the application of theories to specific examples in history and present day problems. The library facilities in economics are sufficient for thorough work.

COURSES IN HISTORY.

I. HISTORY OF ENGLAND.—The development of the English Constitution is traced from Anglo-Saxon institutions and the contributions of the Normans. Prominence is given to the study of Magna Charta, the king, barons and commons, the English church, the Stuarts and parliamentary government, the commonwealth, financial policies, taxation colonization and similar questions.—4.

II. AMERICAN CONSTITUTIONAL HISTORY.—The evolution and development of the American Government is followed from the Mayflower compact to the present time. From copies of the original documents are studied the charters and important laws of the colonies and their influence on local government. The beginnings of the American Republic are traced from the colonial compacts looking toward union, the acts of the continental congress, the articles of confederation and the northwest ordinance. The history of the making of the constitution of the United States is studied from the journals of the convention, the Madison papers, the Elliott Debates and the Federalist. The interpretation of the constitution is gathered from executive messages and proclamations, treaties, laws of congress and decisions of the supreme court.—4.

III. STUDIES IN ANCIENT HISTORY.—Including the Kingdoms of the East, Egyptian Civilization, the Grecian States and the Roman States. The aim is to investigate the social, aesthetic, religious, domestic and political life of these peoples; to discover the motif and their educational, family, ecclesiastical, military and political institutions.—4.

IV. MEDIAEVAL HISTORY.—A study of a few of the great movements of the Middle Ages. The migration and settlement of the Teutonic tribes, Mohammed and Saracen Civilization, the Empire of Charlemagne, the Byzantine Empire, rise of the Papal Power, Feudalism, Monasticism, the Crusades, the beginnings of modern European Governments, the growth of cities etc.—4.

V.—MODERN EUROPEAN HISTORY.—Era of discovery and conquest, the Reformation, rise of the Dutch Republic, thirty years war, Peter the Great and Russia, Frederick the Great and Prussia, the French Revolution and Napoleon, disturbances of 1830 and 1848, Crimean war, present status of the church and society, constitutions of modern European nations, current problems of trade, the army, finances and balance of power.—4.

VI.—INTERNATIONAL LAW.—Woolsey's International Law is used as a basis. Lectures and library work supplement the text. The laboratory or source method of study is pursued so far as possible by an investigation of treaties and the findings of international congresses and conventions.—4.

COURSES IN ECONOMICS.

I. ELEMENTS OF POLITICAL ECONOMY.—This course includes the consideration of such topics as wealth, capital, land, labor, value, money, coinage, banking, rent, interest, wages, profit, population and taxation. It comprises the study of the Mercantile System, the Natural

Liberty System and the Historical School. The views of such economists as Adam Smith, Malthus, Ricardo, John Stuart Mill, Cairnes, Say, Dunoyer, Carey, Roscher, Jevons, Marx, Walker and Henry George are examined.

—4.

II. MODERN ECONOMICS.—This course will consist of the discussion of some of the most important questions in economics of the present time and the trend of recent legislation. Among these questions may be mentioned Trusts or Combinations of Capital, Labor Unions, Government Subsidies, Taxation and the Single Tax Theory, Government Ownership of Public Utilities, Recent Currency Legislation, Banking Functions and Laws, Franchises, Socialistic Settlements and Co-operation.—4.

Department of Philosophy and Education.

GENERAL INFORMATION.

The best introduction to work in this department is obtained from Courses I. and II. Usually students will not be admitted to other courses until they have completed one semester in Psychology. It is hoped the department may be found helpful in two ways: first, to all advanced students by assisting them to coordinate the results acquired from other studies and from their own thinking; second, to all students who expect to become teachers, by laying the foundation of all professional training.

The Library is fairly well supplied with standard works on Psychology and Education. A liberal allowance is made each year for additional books. Nearly all periodicals in English which can be used to advantage by undergraduates are on the library tables.

Some excellent models of brain and sense-organs, and a fine collection of microscopic slides of human brain and cord are available. A good beginning has been made towards equipping a psychological laboratory. Much of the apparatus belonging to the departments of Biology, Physics and Chemistry has been generously placed at the service of students in Experimental Psychology. It is already possible to illustrate most of the standard experiments in a beginning course. Students will be encouraged to improvise apparatus and to invent new problems which can be solved by arrangement of available material.

COURSES IN PSYCHOLOGY.

I. GENERAL PSYCHOLOGY.—An introductory course. Lectures, textbook work and laboratory demonstrations. First semester. M., W., F. 9:30. Not open to Freshmen.

II. INTRODUCTORY COURSE (Continued).—Second semester, M. W. F. 9:30.

III. EXPERIMENTAL PSYCHOLOGY.—A laboratory course. Typical experiments from the various manuals upon sensation, perception, attention, association, memory, movement, affective expression, imagery, rhythm, fatigue, etc. Lectures and discussions interspersed as needed. Five hours per week. Two hours credit. First semester. T., Th. 1:30 to 4.

IV.—EXPERIMENTAL PSYCHOLOGY (Continued).—One or two special problems with a general study of psychological methods. Results to be collected in the form of a thesis. Two or more hours credit according to time or effort. T., Th. 1:30 to 4.

V. GENETIC AND APPLIED PSYCHOLOGY.—The general plan of the course will be to trace the gradual unfolding of the mind in the animal series and in the human child, giving such account of its operations in the more complex fields of man's activity, pedagogy law medicine and art, as time and library facility will permit. First semester. M., W., F. Hour to be arranged.

VI. PSYCHOLOGICAL SEMINARY.—Members meet once a week for the discussion of a general topic selected for study at the beginning of each semester. There will be readings, discussions, and reports of researches. First and Second semester. Open to all students of Psychology and Education. Two hours credit.

VII. ORGANIC EVOLUTION.—A course given conjointly by the departments of Biology, Geology and Psychology. Lectures and library work. First semester. Twice a week.

COURSES IN PHILOSOPHY.

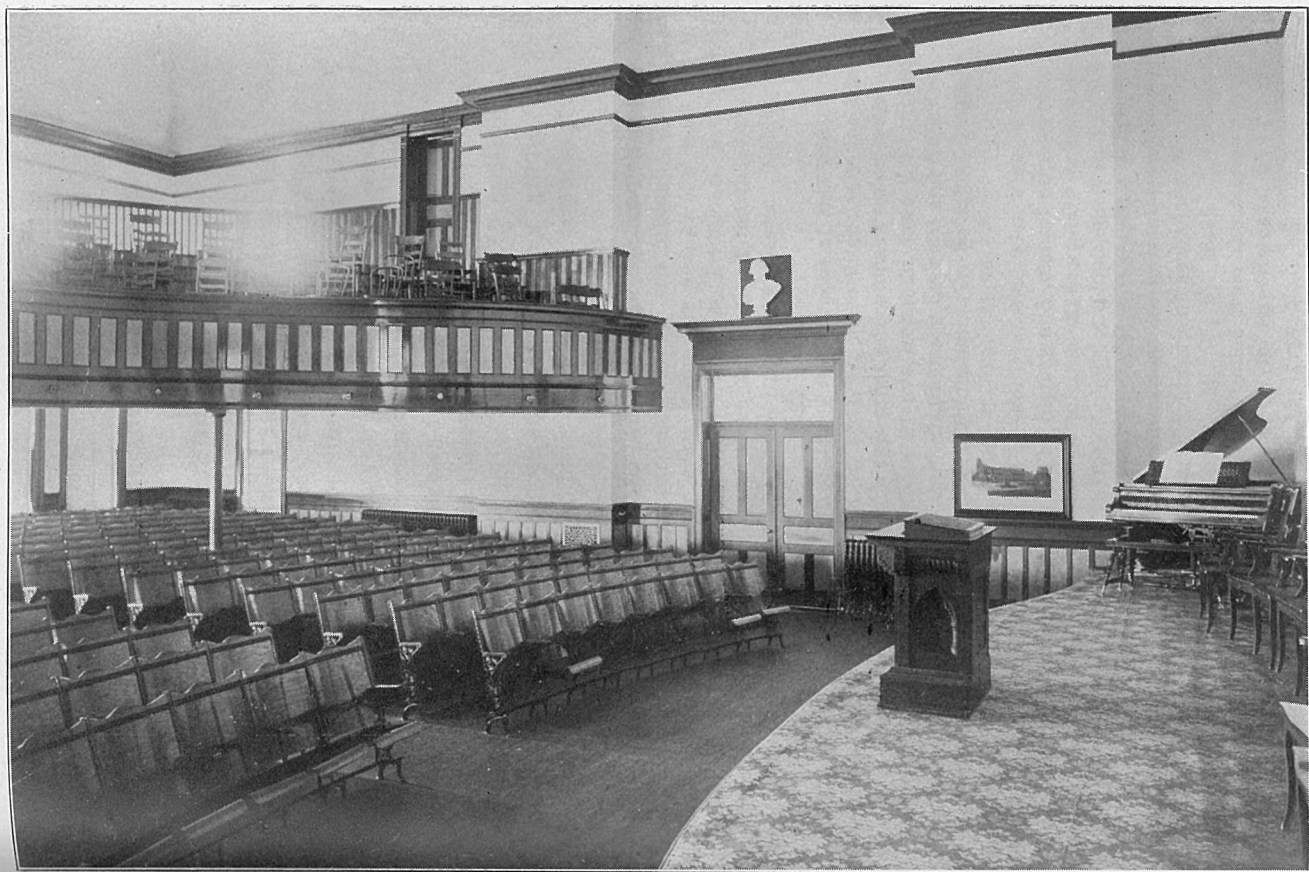
I. LOGIC—Recitations and exercises in logical analysis, with a study of scientific method. May be elected by second year students but will not be accepted as part of required work. First semester, T., Th. 8:30.

II. ETHICS.—Lectures. Second semester, T., Th. 8:30. Not open to Freshmen.

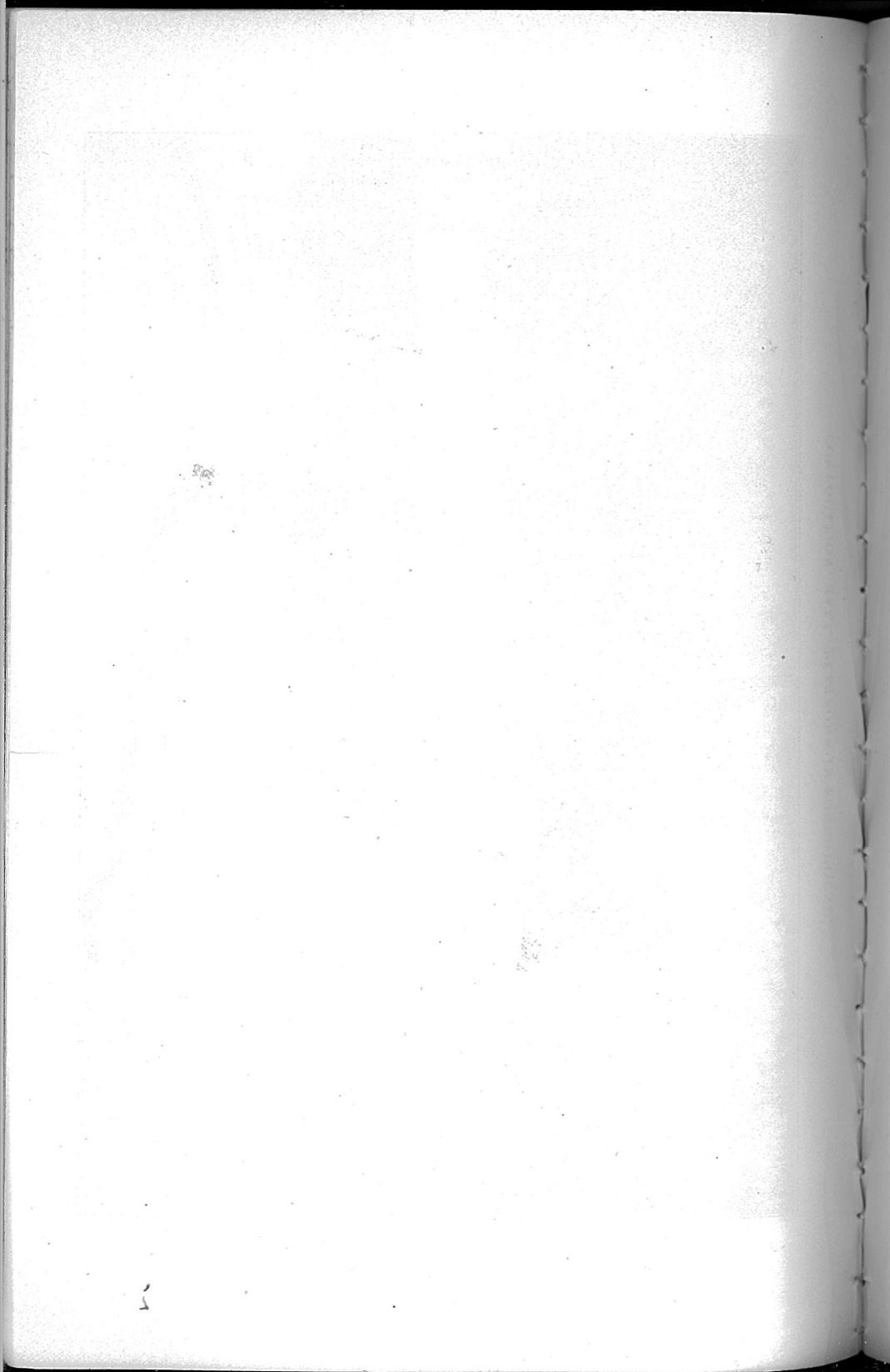
III. HISTORY OF GREEK PHILOSOPHY.—A general survey of the intellectual work of the ancients, with a more careful study of the systems of Plato and Aristotle. First semester, M., W., F. Hours to be arranged.

IV. HISTORY OF MODERN PHILOSOPHY.—Enough of Mediaeval thought will be reviewed to connect Course I. with modern views. Attention will be given chiefly to a few great thinkers in recent times, such as Descartes, Hume, Kant and Spencer. Second semester, M., W., F. Hours to be arranged.

The requirements in this department for the degree A. B. or B. S. can be met by completing five hours work in Psychology I. and II.



CONVOCATION HALL—PLATFORM IN FOREGROUND.



Education.

The following courses in Education are now offered. More will be added as needed. It is the purpose of the work in Education not only to give such instruction in the principles and history of education as is desirable in a truly liberal culture, but to provide adequate professional preparation for those University students who intend to teach. The statutes of Montana provide that graduates of the University shall be given a life diploma to teach in the state after two years of successful experience of teaching. One aim of the courses in Education is to assist our graduates in preparing themselves for immediate entry into the best schools. It is hoped that the next legislature may recognize our efforts to prepare for the active duties of life by following a custom of other states which give, immediately upon graduation, a state certificate to those who have completed the required work as prescribed by the department of education.

I. HISTORY OF EDUCATION.—An outline of the leading educational ideals and practices from earliest times to the present. Special attention will be given to a few great influences and to the work of such educational reformers as Socrates, Comenius, Pestalozzi, Froebel, Horace Mann, and G. Stanley Hall. Open to third and fourth year students. Should be supplemented by Course II. First semester. M., W., F. 11:30.

II. EDUCATIONAL CLASSICS.—It is the purpose of this course to supplement the work of Course I. by studying more intensively the life-work and classical productions of a few great educators. Two or more of the following books will be studied: Plato's Republic, Lock's Thoughts Concerning Education, Rousseau's Emil, Pestalozzi's Leonard and Gertrude, Froebel's Education of Man, Spencer's Education. To be taken with or preceded by Course I. First semester. T., Th. 11:30.

III. HIGH SCHOOL PEDAGOGY.—For students who wish to prepare to teach in the high school. The history and general principles of high school methods and discipline. Relation of secondary schools to the higher and lower schools. The psychology of adolescence, and adaptation of the high school to the needs of different careers; the course of study. General history of secondary education; its present organization in the different countries of Europe; the history of secondary education in the United States. Second semester. M., W., F. 10:30.

IV. PRINCIPLES OF TEACHING.—Studied from the standpoint of present-day Psychology and recent studies in Experimental Pedagogy. The chief emphasis will be placed on the psychology of teaching and learning, on methods of learning, instead of on methods of teaching the various school subjects. Second semester. T., Th. 10:30.

V. EDUCATIONAL PSYCHOLOGY.—The lectures and readings in this course will cover some of the more important chapters in psychology in their educational aspects, such as habit, attention, memory. Education of the senses. Apperception and association. Feeling and interest in relation to instruction and training. The instincts of children as the basis of apperception and interest. Motor education and education of the will. Certain aspects of mental hygiene and hygiene of instruction. Second semester. M., W., F. Hour to be arranged.

Department of English and Rhetoric.

I. ELEMENTARY RHETORIC.—Outlines of rhetoric, with exercises and themes. Required by all first year college students, and is prerequisite to all other courses in English. First semester, M., T., W., Th. 9:30.

II. DESCRIPTION AND EXPOSITION.—Critical study of literary models. Frequent written exercises. Second semester, T., Th. 9:30.

III. ARGUMENTATION AND PERSUASION.—Study of argumentation with a view of the acquisition of an effective style in debate. Practice in brief-writing. One oration. Open to a limited number of students. First semester, M., W. 1:30.

IV. NARRATION.—Critical and constructive work in short-story writing. Second semester, M., W., F. 9:30.

V. VERSIFICATION.—Study of the forms of English verse. Topics assigned for individual study and reports. First semester, T., Th. 1:30.

VI. PROSE.—Study of English prose style. Topics assigned for individual study and reports. Second semester, Tu., Th. 1:30.

VII. OLD ENGLISH.—Selections in prose. Elements of historical English grammar. Open to students who have had one semester of German. First semester, M., Th. 11:30.

VIII. MIDDLE ENGLISH.—Selections from Chaucer's Canterbury Tales. Second semester, T., Th. 11:30.

IX. HISTORY OF THE ENGLISH LANGUAGE.—A basis for the study of English grammar, First semester, T., F. 11:30.

X. BALLADS.—Selections from early English popular poetry. Second semester, M., W. 11:30.

XI. BALLADS.—Research work. A course for graduate students. First semester, F. 9:30.

XII. THESIS.—By special permission a student may undertake a piece of research work, the results of which shall be embodied in a thesis. Two-hour credit. Second semester, F. 10:30.

Department of Literature.

COURSES IN LITERATURE.

I. WRITERS OF THE ELIZABETHAN PERIOD.—This course is the study of Spenser, Marlowe, and Bacon.

A brief history of the pre-Shakespearean drama in lectures.

Reports on Woodbridge's "Technique of the Drama." Open to all students. First semester. Rec., T., Th. 9:30.

II. SHAKESPEAREAN DRAMA.—The critical study of eight plays, so selected as to illustrate the author's range and the variations of his art in the successive periods of his life. Open to students who have completed Course I. Second semester. Rec., M., W., Fri. 9:30. Lib., T., Th.

III. ENGLISH LITERATURE OF THE EIGHTEENTH CENTURY.—Lectures and written papers. Special attention will be given to the works of Pope, Goldsmith, Gray, Addison and Swift. Text Book, Gosse's "History of the Eighteenth Century Literature." Open to all students. First semester. Rec., T., Th. 1:30.

IV. ENGLISH LITERATURE OF THE NINETEENTH CENTURY.—Prose—Carlyle, George Eliot, Arnold, Lamb and Ruskin. Lectures on the literature of the nineteenth century. Open to all students. Second semester. Rec., T., Th. 1:30. Lib., M., W., F.

V. THE ROMANTIC MOVEMENT.—The course begins with the study of the origins and the progress of the movement in the eighteenth century, but particular attention is paid to the period beginning with the "Lyrical Ballads" (1798) and ending with the death of Scott. Wordsworth, Coleridge, Byron, Shelly, Keats and Scott are studied in representative selections. Open to advanced students. First semester. Rec., M., W., F. 8:30. Lib., T., Th.

VII. AMERICAN LITERATURE.—A survey of American literary history and the discussion of notable works in prose. Open to all students. First semester. Rec., M., W., F. 11:30. Lib., T., Th.

VIII. AMERICAN LITERATURE.—Selections from the verse of the greatest American poets. Open to all students. Second semester. Rec., T., Th. 11:30.

IX. THE EXTENDED AND CRITICAL STUDY OF THE POEMS OF BROWNING.—Graduate Course.

X. Some department, subject or figure in literature will be selected as the basis of the work of this course. Graduate Course.

XI. INTRODUCTORY LITERATURE.—Elementary work in essays, poetry, drama and fiction. Open to first year students. Second semester. Rec., T., Th. 8:30.

Note.—Rhetoric I. is prerequisite to the work in this department.

Library Science.

The purpose of this course is to give students systematic instruction in the use of the library. An effort is made to familiarize the student with such catalogues, bibliographical aids, and general reference books as will enable him to investigate a subject with intelligence. The following course is offered:

Course I. General Reference.—Lectures, reading and reference work. Lectures will be given on the following topics: the arrangement of the library and the privileges granted students, the use and value of the card catalogue, dictionaries and encyclopedias, Poole's index and periodical literature, classification, cataloging, atlases and gazeteers, note-taking, book-binding and the care of books, government publications, and reference books on English and American literature, history, and science. One hour credit. First semester.

Department of Elocution.

This department offers an opportunity for culture invaluable to all students in the University. It combines the study of the best literature with the art of interpretation and expression. It gives the student control of his own powers and gives him easy, simple, and effective delivery.

Courses I and II are required of all students except those in the School of Engineering.

Course I.—ELEMENTS OF PRACTICAL ELOCUTION.—Pantomimic action, recitation, and oration. First semester. T., Th. 8:30.

Course II. PRACTICAL ELOCUTION.—Recitations from classical writers, Shakespeare, Tennyson, Browning, and others. Second semester. T., Th. 8:30.

Course III. PRACTICAL ELOCUTION.—Program construction and production. Program to consist of five or more numbers from varied sources or the works of a single writer.—3 hours.

Course IV. PROGRAM WORK CONTINUED.—Attention will be given to a one theme program.—2 hours.

Course V. ORATION AND DEBATE. This course is entirely for the production of oration and debate, with special work in extemporaneous speaking.—2 hours.

Course VI. SIGHT READING. This course is offered those who wish special work in oral reading.—2 hours.

PREPARATORY ELOCUTION.—This course is offered to preparatory students. The work is suited to the needs of students in this department.—2 hours.

Department of Latin and Greek.

GENERAL INFORMATION.

1. The primary aims of this department are the acquisition of such a mastery of the languages as to enable the student to read them with some degree of facility, to read the greatest possible amount of the best Greek and Roman literature, and to make the work subservient to general culture in the English language and literature.

The scope of this department is conceived to include, not only the study of the language and literature of the ancient Greeks and Romans, as narrowly defined, but also some attention to all phases of their civilizations. Without this broader view, some of the most important results of classical studies cannot be attained. For this reason, the study of the arts, institutions and life of the Greeks and Romans will be given due prominence, and provision has been made for this part of the work.

2. In the required courses, the study of grammar will be pursued in connection with the reading, not as an end in itself, but as a means of intelligently reading the language, with or without translation. The more systematic and scientific study of grammar will be provided for in elective courses.

3. In connection with the prose reading, exercises in writing Latin and Greek will be used. The training in syntax will be largely given in connection with this work.

4. There will be almost daily practice in reading and translating at sight, generally from that portion of the text assigned for the next day's reading.

5. "Bennett's Latin Grammar" and "Hadley-Allen's Greek Grammar" will be used for the ordinary class room work. Editions of the texts will be chosen as far as possible from those which have references to these grammars. Students are advised to bring with them any Latin and Greek text books they may have, but not to purchase books before definite directions are given. The most essential aids for study, such as maps, charts, and works of reference, are provided by the University.

6: The work of the college courses outlined below will be advanced as fast as it seems practicable to advance the requirements of admission, and should not be regarded as presenting the ultimate standard or ideal.

This department is supplied with a set of Kiepert's Classical Maps, with Cybulski's colored wall charts, and a carefully chosen selection of lantern slides and mounted photographs for the illustration of Greek and Roman Archaeology and Private Life.

The Library is well equipped with the most important and essential works of reference for this department.

COURSES IN LATIN.

- I. VERGIL'S AENID.—First three books. Elements of Prosody. 5 hours. 10:30.
- II. VERGIL'S AENID.—Books IV., V., and VI.—5 hours, 10:30.
- III. HORACE.—Selected odes. First half of semester. 5 hours. 8:30.
- IV. LIVY AND TACITUS.—Selections.—Second half of semester. 5 hours. 8:30.
- V. PLAUTUS.—First semester. T., Th. 11:30.
- VI. TERENCE.—Second semester. T., Th. 11:30.
- VII. PRIVATE LIFE OF THE ROMANS.—Descriptive; no knowledge of Latin required for this course; open to all students. M., W., F. 1:30.

This course is given in the Second semester and should be preceded by the course in Greek life.

COURSES IN GREEK.

- I. A FIRST GREEK BOOK.—Elements of Greek grammar.—5.
- II. FIRST BOOK OF ANABASIS.—Sight reading, writing Greek; study of grammar in connection with the reading and writing.—5.
- III. ANABASIS CONTINUED.—Sight reading, writing Greek, grammar with topical outline.—5.
- IV. HOMER'S ILIAD.—First half semester, selections.—5.
HERODOTUS AND THUCYDIDES.—Second half semester, selections.
- V. DEMOSTHENES.—Second half, selections. ?
HERODOTUS AND THUCYDIDES.—Second half, selections.
- VI. PLATO.—First half, selections.—5.
- VII. GREEK DRAMATISTS.—One play of each from Aeschylus, Sophocles and Euripides, selections from Aristophanes.—5.
- VIII. PRIVATE LIFE OF GREEKS.—Descriptive; no knowledge of Greek required for this course, open to all students; given in First semester.—M., W., F. 1:30.

Department of Modern Languages.

GENERAL INFORMATION.

The aim of the beginning year of the Modern Language Courses is to give the student a thorough knowledge of grammar; to this is added reading of easy prose; this is followed in the second year with syntax and intermediate readings, the translation of scientific (biological, chemical, and technical monographs). Writing short essays in the languages will be required during the year, and some conversation will be given. In the third year, which is elective, more difficult readers will be used, such as "Faust" or "Wallenstein" in German; "Esther, Athalie," Moliere in French, and Cervantes in Spanish.

During the third year conversation and composition will be made one of the chief aims of instruction. Extracts from modern authors will be read, and the study of the literatures will be made a special topic.

Tests will be given in the different classes from time to time. Elective classes will be organized only upon application of three or more students for the work.

GERMAN.

A course of three years has been planned.

During Courses I and II, Becker's German Grammar will be used and Carruth's German Reader, followed by Wilhelm Tell, Bernhardt's Composition, Drei Kleine Lustspiele. M., T., W., Th., F. 8:30.

Courses III and IV.—Continuation of Courses I and II. M., W., F. 11:30. Readers: Schiller's, Wallenstein, Minna von Barnhelm, Schiller's Ballads. Sight Readers; Geschichten aus Deutschen Staedten, Karl Heinrich, etc.

The third year (Courses V and VI) will be devoted to a study of the classics, some of Schiller's and Goethe's works, as Schiller's Ballads, Goethe's Faust, Part I, and scientific monographs. These latter will be given to those students taking the scientific course. Essays will be required in the various subjects which students are pursuing, such as chemical, biological, etc. M., W., F. 1:30.

FRENCH.

Courses I and II devoted to the study of Frazer and Squair's complete French course.

Reader: Daudet trois contes modernes, Pour Apprendre a Parler. La Tulipe Noire, L'Abbe Constantin, Colomba. M., T., W., Th., F. 9:30.

Course III and IV consist of intermediate readings, such as Zola's Debacle, Hugo's Hernani. M., W., F. 10:30.

Courses V and VI (Elective)—will be devoted to the study of French

classics and scientific writings and Duval's *Histoire de la Literature Francaise*, Souvestre's *Un Philosophe sous les toits*. Sight Readers: *Les Miserables*, *Notre Dame de Paris*.

SPANISH.

A three years' elective course will be given, if called for. The first year, or Courses I and II, will be taken up with the study of grammar and easy readings from modern prose, followed by Courses III and IV, which will be devoted to readings of Spanish Classics and Literature. Syntax and exercises in composition and conversation will be given. M., W., F. 2:30.

A third year, Courses V and VI will be continuation of Courses III and IV. Composition and conversation. Recitations will be held in Spanish. Readers: *El Capitan Veneno*—*El Si de las Ninas*. Extracts from *Don Quixote*. Hours to be arranged.

Department of Chemistry.

THE CHEMICAL LABORATORIES.

The Department of Chemistry occupies most of the second floor of Science Hall, which contains eight rooms and a hall. The student laboratories, two in number, are on the north side of the hall, the lecture room, store room, and office and private laboratory are on the south side. The balance room, also used for a library and reading room, is at the end of the hall and opens into the quantitative laboratory.

Of the two laboratories, the larger is for the work in general chemistry and qualitative analysis. This is fitted with two rows of desks, underneath which are arranged the drawers, forty in number, for the students' apparatus. Each desk is provided with a water faucet over a sink, with taps for water on the desk, and tips for gas. The laboratory will accommodate thirty-two students in all, with a maximum number of sixteen in one section. Each student is given a full set of apparatus. Each desk is locked by a single padlock.

The reagents are stored in large glass-stoppered, tabulated bottles, in one corner of the room. The ventilation for the laboratory is procured through five hoods, each connected with a separate steam-heated flue. Water and gas are brought into each hood.

The quantitative laboratory will accommodate sixteen students at once. This room has northern and western exposures, and is



GYMNASIUM—REAR VIEW.

therefore well lighted. The arrangement of hoods and flues is the same as in the other laboratory. Eight separate drawers or closets, all locked by one padlock, are given each student. This insures perfect safety for the many pieces of apparatus and solutions in use. The desks are all fitted with stationary iron stands, of the universal type, which allows the desk to be used in all of the many ways necessary for analytical work. Each desk has also an iron plate heated by gas burners. The gas is furnished to the student either by the ordinary gas tip, with rubber connection, or by a stationary swinging gas jet, fitted with a Bunsen burner. Water is brought to each desk in taps, and to the sinks in the usual manner. Brass suction pumps are attached to the latter, and a good suction obtained for filtration processes. The reagents are provided at each desk and in more complete sets in a suitable case in one corner. The sets of apparatus issued to each student are very complete and consist of beakers, flasks, crucibles, burettes, pipettes, bottles, etc.

In the balance and reading room are two Becker balances, sensitive to .2 m., for the beginners in quantitative analysis. Shelves are fastened to the solid wall, and independent of the floor, for four balances.

The Department Library, placed in this room, is under the direction of the General Library and subject to such restrictions as will insure the safety of the books. It contains over 200 volumes in English and German, including Dammer and Beilstein, dealing with analytical, inorganic, physical, organic and industrial chemistry, and toxicology, and a complete set of the *Zeitschrift fur Analytische Chemie*, and the *Berichte*.

The following chemical journals are kept on file:

American Chemical Journal, Journal of the American Chemical Society, The Analyst, Journal of the Chemical Society, *Chemisches Central-Blatt*, *Zeitschrift fur Anorganische Chemie*, *Zeitschrift fur Analytische Chemie*.

The lecture room, on the south side of the hall will seat forty persons, and is provided with the usual accommodations for taking notes from lectures. The lecture table 4x14 feet, is provided with water and gas for lecture experiments.

The private laboratory and office is a well-lighted room, 12x17 feet in size, located in the corner of the building. It opens into the lecture room and into the store room. It is provided with a

laboratory desk, a hood, and is supplied with water and gas. An accurate analytical balance and a first class assay balance, sensitive to 1-200 milligram, are used for the most accurate determinations.

The store room adjoins the office, and opens also into the lecture room. Students can obtain material from this room through a small window opening into the hall. In this way the room is easy of access to the students when working in the laboratories. The store room contains, besides shelves and cases for storage, a desk provided with gas, water and suction. This is used for preparation work and is a great convenience. Ventilation is secured by means of a hood of ample size. The laboratories and rooms are all lighted by electricity, or by gas light from Welsbach burners.

Distilled water is made in a block tin still, placed in the attic above the laboratory, and is conducted to the large laboratory through block tin pipe. The still is connected with the steam heating system and is so arranged that it is impossible for any solid or other foreign substance to pass from the system into the condenser. The water is collected in a 20-gallon stone reservoir, thence conducted to the rooms below. The still is so connected as to require no attention, as it is connected with an overflow in the sewer. On the whole, this plant is a model of its kind for small laboratories.

The gas is made from gasoline by means of a machine from the Detroit Gas Machine Co., of Detroit, Mich. The capacity of the carburetter is 465 gallons of gasoline, and is ample for all uses of the present laboratories connected with it. The plant is provided with a combination mixer, furnished by this company, which is believed to be a valuable adjunct to the machine.

ASSAY LABORATORY.

The Assay Laboratory is fitted with a large two muffle brick furnace, a Cary combination gasoline furnace, and a Brown's portable furnace, a cupel machine, rock crushers and other necessary apparatus. The assay balance, made by Wm. Ainsworth of Denver, is sensitive to 1-200 milligram.

COURSES IN CHEMISTRY.

The courses in chemistry cover the field of pure chemistry, and are also designed for those who expect to engage in technical work.

As an introduction to all courses in this subject, a course in General Chemistry extending over two semesters is given. This is presented by recitations, lectures and laboratory work, and is required of all students in the University. It should be taken in the Freshman year. In this year's work students gain a clear conception of chemical elements, chemical changes, and the philosophy of Chemistry in general—principles too often indistinctly learned, but absolutely essential for all future work in this science. The student will be expected to do a large amount of quantitative work in connection with the laboratory course.

One-half year in Qualitative Analysis follows this work. It is taught by lectures and recitations, but the larger proportion of the student's time is spent in the laboratory. It is expected that another semester will be devoted to Quantitative Analysis which involves the principles of analysis by both gravimetric and volumetric methods.

These two years of work should be considered as essential for all other work in Chemistry and for advanced work in Mineralogy. It is recommended that Assaying be not taken up until after this amount of work has been finished, although only the first three semesters of work are required.

Advanced courses in Chemistry are taken up at the student's option. A course in Organic Chemistry involving lectures and laboratory work on the chemistry of the compounds of carbon is offered for those students fitted for the work.

The course in Physical Chemistry should be taken by all students specializing in either Physics or Chemistry. It is of great value to students of Philosophy.

CHEMISTRY AS A PROFESSION.

There is a large demand in Montana for Chemists who have a thorough mastery of their profession. The principal lines of work open to professional chemists are:

- I. Teaching in colleges and secondary schools.
- II. As chemists and assayers for smelters and mines.
- III. Other technical work. There is a steadily increasing demand for chemists in many industries, including iron and steel works, sugar refineries, color works, print works, acid works, chemical manufactories, railroads and all large corporations. Manufacturing chemistry is a field of great profit, especially to those who introduce or develop new industries.
- IV. Analytical chemistry and assaying. There is always a demand

for chemists who can give their whole time to questions in legal and technical chemistry. The most profitable fields are: Toxicology, mining chemistry, sanitary chemistry, industrial applications and physical chemistry.

V. Government and state work. The geological surveys, the Philippine service, boards of health, agricultural experiment stations and other government institutions, employ many chemists.

Ample apparatus is at the disposal of the students (see equipment), and with the fine laboratories every inducement is offered to students to make themselves proficient in this interesting line of science.

COURSES IN CHEMISTRY.

I. GENERAL INORGANIC CHEMISTRY.—Non-Metals.—Required of all students. Open to all students who have no entrance conditions in mathematics. Two lectures or recitations per week. Two afternoons of laboratory work. Four hours. First semester. Lectures, 9:30-10:30. T., Th.

II. GENERAL INORGANIC CHEMISTRY.—Metals.—A continuation of Course I. Required of all students. Four hours. Second semester.

III. (a) QUALITATIVE ANALYSIS.—Required of all students specializing in chemistry, and must be preceded by Courses I and II, or their equivalent in some laboratory of acknowledged standing.

Two lectures and two or three afternoons of laboratory work.
Four or five hours first semester.

III. (b). ADVANCED QUALITATIVE ANALYSIS.—A continuation of Course III. Required of mining and chemistry students.

Four or five hours, second semester.

IV. QUANTITATIVE ANALYSIS.—Introductory; must be preceded by Courses I, II and III (a). The principles of gravimetric and volumetric analysis are presented in this course. Required of all students specializing in Chemistry, Mineralogy and Assaying. Four afternoons of laboratory work, with explanatory lectures. Four hours. Either semester.

V. (a). DRY ASSAYING.—Must be preceded by Courses I and II and if possible by III (a) and IV. Students specializing in chemistry and assaying will not be permitted to take this course unless preceded by Course II and Mineralogy and accompanied or preceded by Course III. Includes laboratory work in grinding and sampling ores, and the fire assay for gold, silver, lead and copper, and the bullion assay. Determinations involving volumetric methods, or the so-called wet methods, will be given as part of Courses IV, V or VI, depending upon the needs of the student.

Lectures on occurrences of ores, methods of sampling and fluxing for the assays of all of the principal metals will be given. Students desiring to specialize in this work should precede the course by Mineralogy. Required of students preparing for mining. One lecture and two afternoons. Three hours. Second semester.

V (b). WET ASSAYING.—This course is designed for those who expect to become chemists in smelters and for those who are interested in mining work. Three afternoons. Either semester.

VI. MINERAL ANALYSIS.—Systematic.—Quantitative analysis of representative minerals. Required of all students specializing in chemistry. Four afternoons. Either semester.

VII. ORGANIC CHEMISTRY.—Lectures and recitations on the chemistry of the compounds of carbon, including the fatty and the aromatic series. The aim of the course will be to take up very thoroughly the simpler compounds, going with great detail into a study of the relationships and characteristic reactions of the different classes of organic compounds. Noyes' Organic Chemistry is used as a text and Richter's or Bernstein's Organic Chemistry will be used as a reference book. Must be followed by Course VIII.

Prerequisite: General Chemistry and Qualitative Analysis. Two hours. First semester in alternate years.

VIII. ORGANIC CHEMISTRY.—A continuation of Course VII. Two hours. Second semester, in alternate years.

IX. ORGANIC PREPARATIONS.—Laboratory work. Open in connection with Course VII to students who have completed Course III. Two afternoons. First semester, in alternate years.

X. ORGANIC PREPARATIONS.—A continuation of Course IX. Open to students who are taking Course VIII. Two afternoons. Second semester, in alternate years.

XI. PHYSICAL CHEMISTRY.—Lectures, assigned readings and reports. Morgan's Physical Chemistry is used as a text. Course XI is necessary for all students who wish to acquire more than a very elementary knowledge of chemistry. Must be preceded by Courses I, II and III, and by Courses I and II in physics. Three hours. First semester, alternate years.

XII. PHYSICAL CHEMISTRY.—A continuation of Course XI. One and two afternoons of laboratory work. Three hours. Second semester.

XIII. ELECTRO-CHEMISTRY.—The theory of electrolytic dissociation and its application to storage batteries and primary cells. Required of Engineering students. Two lectures and two afternoons of laboratory work.

XIV. FUELS, AND THE METALLURGY OF IRON, STEEL, COPPER AND LEAD.—Lectures, assigned reading and reports. Two lectures will be given per week, and each student will be expected to hand in a paper on some practical subject at least once a week. Three hours. First semester, alternate years.

XV. INDUSTRIAL CHEMISTRY.—A continuation of Course XII. Will be given only when a sufficient number of students desire to continue the work through this semester. Acid and alkali manufacturing, sugar making and refining, petroleum, etc. Thorp's Industrial Chemistry is used in reference book. Three hours. Second semester, alternate years.

XVI. GAS ANALYSIS.—A short course in the technical analysis of gases with Hempel's apparatus. One or two afternoons. Either semester.

XVII. ORGANIC ANALYSIS.—Open to students who have completed Courses IV, VII, IX and X. Two afternoons. Either semester.

XVIII. INORGANIC PREPARATIONS.—A laboratory course in the preparation and purification of inorganic compounds. Lengfeld's Inorganic Chemical Preparations will be used as a text. Two or four afternoons. Either semester.

XIX. ADVANCED INORGANIC PREPARATIONS.—A continuation of Course XVI. Two or four afternoons. Either semester.

XX. PHYSIOLOGICAL CHEMISTRY.—Including Toxicology. Four hours. First semester.

XXI. PHYSIOLOGICAL CHEMISTRY.—Four hours. Second semester.

XXII. SANITARY WATER ANALYSIS.—Two or four afternoons. Either semester.

XXIV. PHOTOGRAPHY.—Lectures on the Chemistry of Photography for students taking this course in the Department of Biology.

GRADUATE WORK: Many of the above courses are suitable for Graduate Work. Courses VII to XXIII, inclusive, will be accepted for advanced degrees when taken with the following:

XXV. RESEARCH.—Special problems in Organic Chemistry, Analytical Chemistry, Water Analysis or Toxicology. For Graduates or Fourth Year students. Four to twenty hours. Both semesters.

Department of Physics and Geology.

DESCRIPTION OF PHYSICAL APPARATUS.

The Department of Physics occupies one-half of the floor space on the ground floor of Science Hall. One lecture room and one laboratory are provided, which adjoin each other and are used to supplement each other in many ways. The lecture room has a seating capacity of fifty, with the usual arm-chairs for taking lecture notes. Provision is made for darkening the room by means of rolling shutters, which are easy of manipulation and give a perfect exclusion of all light.

The lecture room is provided with gas, water, and suction. The laboratory is a room 24 feet square, lighted by windows of eastern and southern exposure. It is provided with two rows of tables in which are forty-six lockers for students' apparatus. Twenty-four students can work in this laboratory at one time. Each desk is provided with gas from taps in the center of the table. Water is brought to the laboratory at two places, where sinks are placed conveniently.

The apparatus is stored in cases, which line the sides of the

laboratory and lecture room, and can be drawn out by the student as needed. All of the material necessary for a complete course of elementary physics, as outlined by the Science Department of the National Education Association, is now available for students' use. Several pieces for advanced work are now on hand, as, many forms of galvanometers, Atwood's machine for falling bodies, a 9" induction coil, a cylinder of liquid carbon dioxide, an excellent air pump, several X-ray tubes, a large Toepler-Holtz machine, electric motors, volt meters, ammeters, Michelson's interferometer, Young's modulus, a wall ballistic pendulum, acceleration apparatus, force table, inertia apparatus, harmonic motion apparatus, an excellent spectroscope, a 50-volt 4-ampere shunt wound dynamo for manual operation, heliostat with clock movement and many other useful pieces.

During the past year the following pieces of apparatus have been purchased by the department: Simple Cathetometer, coincidence pendulum, laboratory clock, Alluards dew point hygrometer standard barometer, air thermometer, Fresnel bi-prisms, Cadmium tubes, total reflecting prisms, etc.

GEOLOGY AND MINERALOGY.

The provisions made for laboratory work in these subjects have been much increased during the past few years. The remodeling of Science Hall furnished two commodious and well lighted rooms, which have been thoroughly equipped for work in Mineralogy, Lithology, General Geology, Petrography and Paleontology.

The collections have been differentiated into nine distinct collections, as follows: 1. A complete set of minerals which is placed on exhibition in the Museum. 2. A duplicate set of minerals in cases of Science Hall for class work in Determinative Mineralogy. 3. The collection of ores and metallurgical products in the Museum for work in Economic Geology. 4. The Invertebrate Fossils in drawers in the Museum, labeled and recorded. 5. A set of type specimens of rocks, igneous, sedimentary and metamorphic, in Science Hall for class work in Lithology and Geology. 6. A set of rock specimens representing the formations of such parts of the State as have been exploited or studied. 7. One set of specimens to illustrate Structural Geology and the various phenomena of geological action as far as possible, also a set of Frazer's Structural Geology including a

large piece of columnar basalt and several beautiful stalactites and stalagmites. 8. One set of Crystal models of 108 figures; and one set of Preston's Modified Celluloid Crystals for study in Crystallography. 9. Crosby's set of 150 Common Rocks and Rock-forming Minerals for study in General Geology, with new and beautiful Xls. and a complete set of Invertebrate Fossils, according to Geological Ages. Also a like set from the U. S. Geological Survey, and a great many fossils, rocks and minerals from the University Summer Geological Expeditions. The apparatus for field work in Geology consists of a Gurley geologist's compass, and an aneroid barometer reading to 16,000 feet, a 50-foot calibrated steel tape, drawing instruments, a complete camping outfit for the summer geological expeditions. A new and beautiful Petrographic microscope has recently been imported from Germany, and together with a large collection of rock and mineral slides the department is well equipped for work along this line.

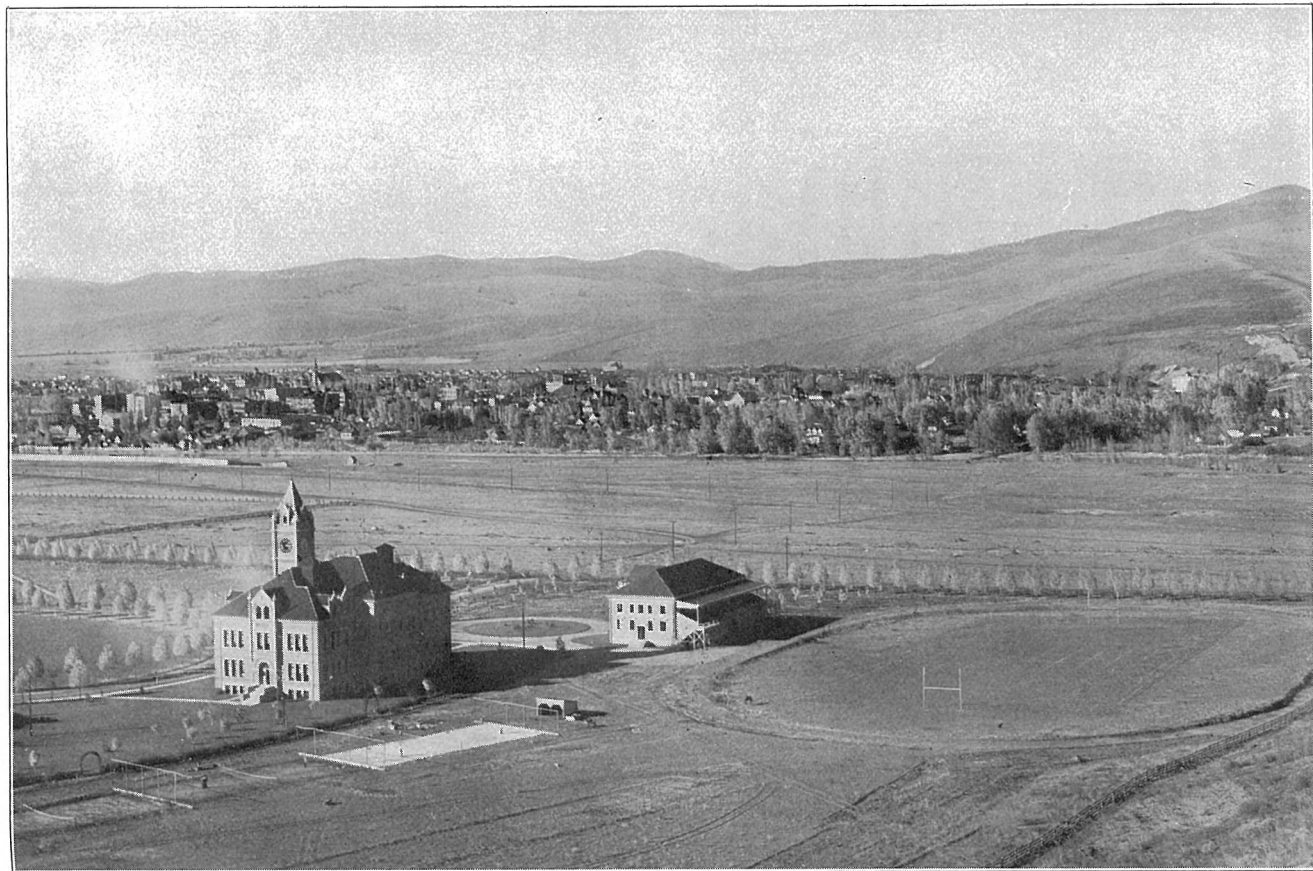
COURSES IN PHYSICS.

This subject is taught by both lectures and laboratory work. In the preparatory courses the students perform nearly all of the experiments after having had the subject presented and explained to them in the recitations.

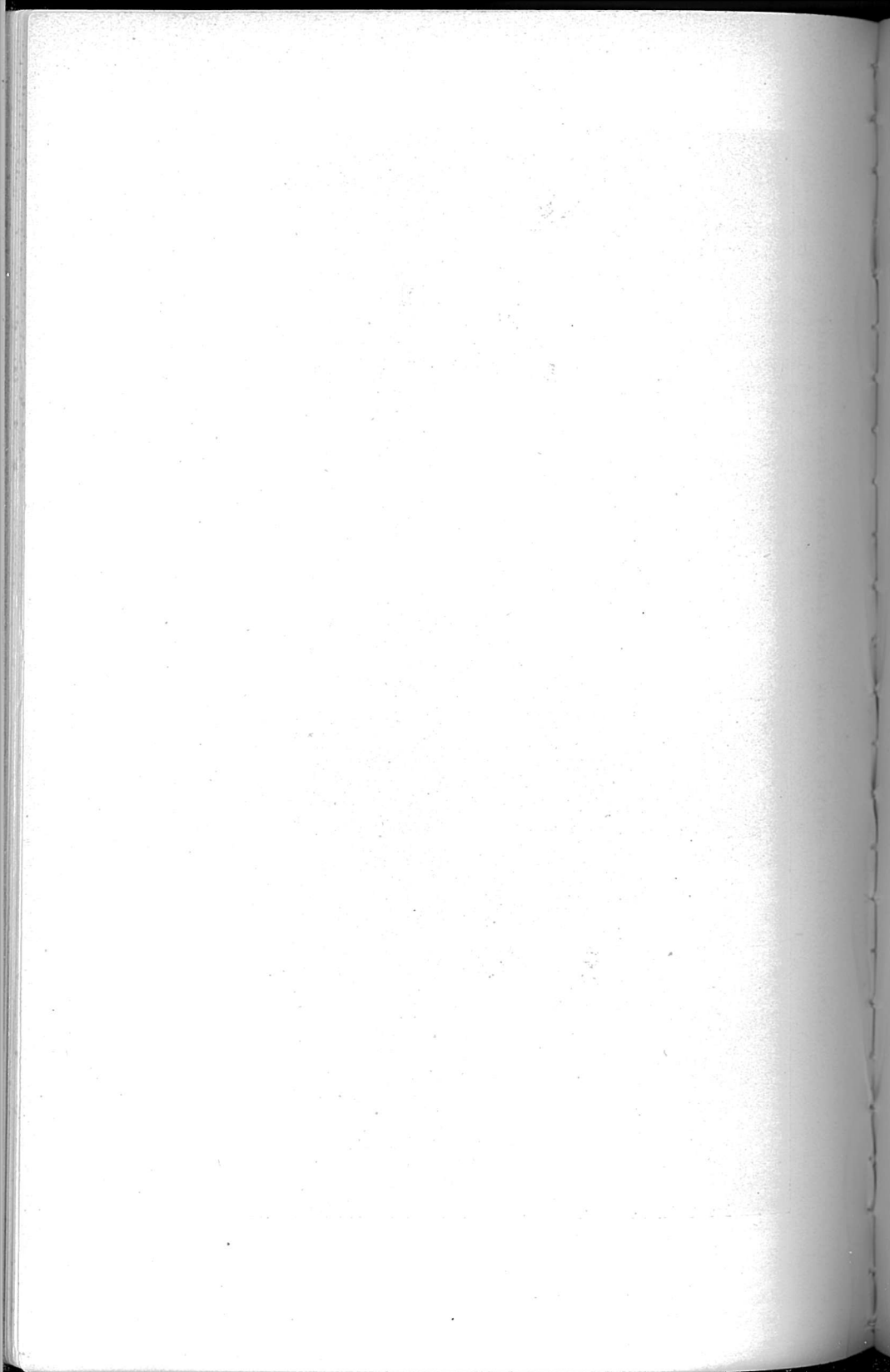
For the advanced work the subject will be presented also by lectures and laboratory work. In this way the illustrative part of the subject is presented to the student by the lecturer, and the quantitative part is done by the student himself. This arrangement gives the greatest efficiency to the department, both for the student and the professor. The equipment in the way of apparatus is well arranged for both lecture experiments and for physical measurements, while the laboratories are equipped with the modern forms of tables, as described under Equipment.

COURSE I. COLLEGE PHYSICS.—Mechanics, Sound and Light. Required of all students in Engineering, and in Scientific Course. Must be preceded by Courses I and II, Preparatory, or their equivalents, and by Mathematics I and II. Not open to freshmen except by special permission. Students conditioned in the required Mathematics may not take this course. Four hours credit, two lectures and two laboratory periods. Course begins in first semester. Lectures accompanied by experiments of illustrative rather than quantitative nature.

COURSE II. COLLEGE PHYSICS.—Heat, Electricity and Magnetism. Second semester. A continuation of Course I, and cannot be taken independently of that course. Four hours.



ATHLETIC FIELD—UNIVERSITY AND SCIENCE HALLS—CITY IN DISTANCE.



COURSE III. ELECTRICAL MEASUREMENTS.—Testing of Electrical Instruments, and the determination of various Electrical Constants, etc. Lectures and Laboratory work. Three hours. First semester. Required of Engineers.

COURSE IV. ADVANCED EXPERIMENTAL PHYSICS.—Hours to be taken, optional with the student, but not less than two hours may be taken. May be taken during either or both semesters. Must be preceded by Courses I and II.

COURSE V. LIGHT.—Primarily a Laboratory Course. A few lectures will be given on the past theories of light and on manipulation of apparatus. Two hours credit. First or second semester. Must be preceded by Courses I and II.

COURSE VI. HEAT.—A careful study of the subject of heat with both lectures and laboratory work. May be taken either semester. Two hours credit. Must be preceded by Courses I and II.

COURSE VII. SPECIAL PHYSICS.—Work for the more advanced students in Physics or for those desiring to specialize. This must be preceded by Courses I, II, V and VI. A Laboratory Course. May be taken either or both semesters.

COURSES IN GEOLOGY AND MINERALOGY.

At present this work is included in one Department and all courses offered are elective. The subjects treated will be general work in Mineralogy and Petrography, and in Dynamic Geology, and Physical Geography. Courses in Paleontology and Stratigraphic Geology will be given and the subjects will receive treatment as part of Dynamic Geology. This region offers unsurpassed opportunities for study of the many and varied processes and geological formations, while the State of Montana and neighboring states are noted for the large number of crystallized minerals found within their borders. As these states are distinctively mining states, all must realize the importance of a thorough knowledge of the principles of Mineralogy and Geology as applied to ores of economic importance. Special attention is given to Economic Geology after the students have prepared themselves in the fields of these two sciences.

The subjects are taught by lectures and laboratory work. For Mineralogy and Lithology, the laboratory work is the examination of the minerals by megascopic and blow-pipe tests. For Geology the laboratory work is applied as field work and excursions to the different exposures of characteristic rocks, and to localities where important geological changes have taken place and left their trace.

COURSE I. GENERAL GEOLOGY.—Text book and lectures accompanied by field and laboratory work. Four hours distributed between lectures and field work like course in Mineralogy. Especial attention is given to Dynamic Geology, but Physical Geography is also fully treated. Prerequisite, Biology, I and II. First semester.

COURSE II. HISTORICAL GEOLOGY.—Continuation of Course I. In addition to the regular lectures and field work there will be an examination of the most familiar fossils and the determination of 150 common rocks and minerals. Second semester. Four hours.

COURSE III. MINERALOGY.—A study of the minerals from their crystallographic and chemical properties. Subject of Crystallography thoroughly reviewed before the study of minerals is taken up. Must be preceded by Chemistry I. Students deficient in preparatory Mathematics or Physics may not take this course. Four hours credit. Two lectures or recitations, and two laboratory practices. This latter work will include an introduction to blowpipe analysis which will be studied during the latter portion of the term.

COURSE IV. LITHOLOGY.—A study of rocks from the physical and chemical properties without the use of the microscope. Particular attention is paid to their mineralogical composition. Should be preceded by Courses I and II. Second semester. Four hours credit. Two lectures and two laboratory practices.

COURSE V. ECONOMIC GEOLOGY.—Deals with the minerals of gold, silver, copper, lead, iron, zinc, antimony, etc., which occur in quantities of economic importance, modes of occurrence of same, and effect of different gangues on value of ores. Must be preceded by Courses I and II. First semester. Four hours, lecture and field work. Trips to mines and mills will be expected. Should be preceded by Courses I, II, III and IV.

COURSE VI. BLOW-PIPE ANALYSIS.—Second semester. A continuation of work in determinative mineralogy. Laboratory work only. Credit one or two hours. Must be preceded by Course III.

COURSE VII. PETROGRAPHY.—The microscopic study of rocks and minerals, together with their classification and general derivation. Two or four hours credit. First and second semester.

COURSE VIII. ADVANCED GEOLOGY.—A more careful study of the principles of Geology. Field and laboratory work and a thorough review of recent geological literature. Must be preceded by Courses I and II. Two or four hours credit. First or second semester.

COURSE IX. INVERTEBRATE PALEONTOLOGY.—A careful study of the invertebrate fossils and their place in the geological time scale. Special attention will be paid to Montana. fossils. Lectures and Laboratory work. Two or four hours credit. First and second semester. Must be preceded by Courses I and II.

COURSE X. SPECIAL WORK.—For students desiring to specialize in Geology and Mineralogy. Work to be outlined upon application.

COURSE XI. PHYSICAL GEOGRAPHY OR PHYSIOGRAPHY.—A study of the principal physiographic features of the earth, their origin, history, etc. Illustrated lectures. laboratory and field work. May be

taken with Course I. Four hours credit. First semester. This course is especially adapted for those desiring to teach physical geography in the secondary schools.

COURSE XII. ORES.—A qualitative and quantitative study of the commercial ores of gold, silver, copper, lead, iron, etc., and a careful study of vein formations. May be taken with Course V. Must be preceded by Courses I, II and III. Four hours credit. First or second semester.

COURSE XIII. ORGANIC EVOLUTION.—This course is given jointly with the Departments of Psychology and Biology. The work in this department will be for six weeks and will consist of illustrated lectures and reading along the lines of the initiation and evolution of the various fossil organic types.

COURSE XIV. GRADUATE WORK.—The department is especially equipped for advanced students in Geology and Paleontology. The state has many unworked geological fields, and by means of the summer geological expeditions much new and valuable material has been gathered. This material includes rocks, minerals, invertebrate and vertebrate fossils, from almost all the geological periods, together with a large collection of Cretaceous and Cenozoic leaves, and offers many problems for original investigation.

Department of Mathematics.

All students are required to take one course in Mathematics. Students in Scientific Course must take Courses I and II. In addition to these, students in Engineering Course are required to take Courses III, IV and V. Students in Classical Course or the Course in Letters may choose between Courses I and II.

Courses not required are open to all students as electives, but must be taken in the order prescribed under courses in Mathematics.

COURSES IN MATHEMATICS.

I. TRIGONOMETRY.—First semester, M., T., Th., F. 11:30.

II. HIGHER ALGEBRA.—Ratio; Proportion; Variation; Binominal Theorem; Arithmetic, Geometric, and Harmonic Progressions; Permutations and Combinations; Undetermined Co-efficients; Summation of Series; Higher Equations. Second semester, M., T., W., Th. 9:30.

III. ANALYTICAL GEOMETRY.—First semester, M., T., W., Th., F. 10:30. Must be preceded by Courses I and II.

IV. DIFFERENTIAL AND INTEGRAL CALCULUS. — Second semester, M., T., W., Th., F. 10:30. When required, must be preceded by Courses I, II and III. If elected, may be taken after Courses I and II.

V. DIFFERENTIAL AND INTEGRAL CALCULUS.—First semester, M., W., F. 9:30. Must be preceded by Course IV.

VI. ELECTIVE GEOMETRY.—Devoted entirely to original work. Either semester. 1. May be taken by any one who has passed the entrance requirements in Mathematics.

VII. ELECTIVE GEOMETRY.—Devoted entirely to original work. Either semester. 1. Must be preceded by Course VI or its equivalent.

VIII. THEORY OF EQUATIONS.—Second semester. 3.

IX. ASTRONOMY.—First semester, T., and Th. 9:30. In addition to recitations, one laboratory period per week is required. Elementary course. Must be preceded by Course I.

X. ADVANCED ANALYTIC GEOMETRY.—Second semester, M., Th. 11:30. Must be preceded by Courses III, IV and V.

XI. HISTORY OF MATHEMATICS.—Second semester, T., and F. 11:30. Must be preceded by Courses III and IV.

For work in Surveying and Differential Equations see School of Mechanical Engineering.

Department of Biology.

GENERAL STATEMENT.

The Biological Laboratories are in University Hall. On the first floor are two rooms and the Museum. In the basement, reached by a private stairway, are the dark room for photography, a store room, and two rooms for laboratory. Across the hall is another room, 24x30 used as an unpacking room and room for general work, and used conjointly by the departments of Biology and Geology.

On the first floor, the first door to the right as one enters from the front, opens into the Biological Lecture Room. This room contains seats for 20, besides laboratory desks for advanced students. It contains one large case for chemicals, one large case for apparatus, a hood case for fumes, a small storage case, and a sink with water.

The room adjoining is used for beginning laboratory work, and contains sixteen tables, besides a large case for material, a microscope case, a sink with four compartments, and a case containing a skeleton.

The tables are of a special pattern, and are admirably adapted to the work. They are 28 inches high, 48 inches long, 28 inches wide. Each table contains on either side two drawers and a space below with a door. The drawers are locked by a wooden bar, and the door has a combination lock. One lock, therefore, locks three compartments. The tops are of oak, 1½ inches thick. Each student works individually at a table and the tables are just high enough to permit the use of a microscope vertically without discomfort. Each desk is fitted with gas, and when artificial light is needed the rooms are well lighted by incandescents. The paraffin baths are kept in the fume hood, and by thermostats may be kept at constant temperature night and day.

EQUIPMENT.

The microscopical equipment is as follows: There are two compound microscopes by Leitz. One of these microscopes is the best made by this firm, and has the following accessories: Three eye pieces, a series of five objectives, one being a one-twelfth oil immersion. It has also revolving stage, with sub-stage condenser after Abbe, and with the iris diaphragm. It has

eye and stage micrometers and accessory Nicol prisms for polarization, and also a camera lucida after Abbe. The other Leitz instrument has two eye pieces and three objectives, and will take the accessory apparatus mentioned under the preceding. By this same maker there is a dissecting microscope with lenses and camera lucida.

There are eighteen microscopes by the Bausch and Lomb Optical Company. Five of these are fitted with substage condensers for illumination. They are all provided with two-thirds and one-sixth objectives and double nose piece. There are two dissecting microscopes made by the same firm, with lenses.

In addition to the microscopes as previously described there is a battery of extra objectives, two inch, one inch, one-half inch, one-fourth inch, one-eighth inch, one-tenth inch, and two one-twelfth inch oil immersion. This gives a wide range of work, and is sufficient for most fields of work.

The additional microscopic and other accessory apparatus is as follows:

A pair of balances; a Miller paraffin bath and a Naples water bath, each with thermostat; an adjustable drawing board for camera lucida; an incubator, with thermostat, for use in bacteriology and embryology; a Castle sterilizer and a hot air sterilizer; a Minot microtome; a student microtome; three Abbe camera lucidas; a Thoma haemocytometer for counting blood corpuscles; a centrifuge apparatus for analysis of blood, milk, wine, and for determination of quantity in lacustrine investigations; a mechanical stage for searching slides for minute objects; Wolfhertgel's counting apparatus for bacteria. A filar micrometer eyepiece for measurement of minute objects, as bacteria and blood corpuscles; two cases for storing microscopic slides, containing nearly 1,500 slides; the usual hardware and glassware constantly used in all biological work.

An important part of the equipment of the department is a good collection of necessary chemicals, stains, and reagents for general histological and physiological study. This includes a series of chemicals representing most of the organic compounds of the human body, for elementary and advanced physiology. There is a large series of stains, dyes, oils and fixatives, imported from Germany, made by Gruebler & Co. This collection is complete enough to permit extensive study and research in animal and vegetable histology.

The working material in photography is as follows: Anthony's copying reducing and enlarging camera, with accessories for making lantern transparencies; a Leitz vertical camera for photo-micrography; a set of lenses for general photography, Bausch & Lomb Optical Company's Set D, consisting of three anastigmat lenses, one of focus $9\frac{1}{2}$ inches, one of focus $11\frac{1}{2}$ inches, one of focus 14 inches; these may be used separately or in any combination of two, making thus the equivalent of six lenses; this set is provided with diaphragm shutter, ray filter, fitted in case; the outfit is one of the best on the market, and its range of usefulness is very great; a Folmer & Schwing camera box for preceding lenses, $6\frac{1}{2} \times 8\frac{1}{2}$, with double holders and kits for 18 plates, and capable of taking sizes $6\frac{1}{2} \times 8\frac{1}{2}$, 5×7 , and 4×5 ; it has 26 inch bellows, and is fitted with carrying case, especially adapted to outdoor work; a stand for use in horizontal and vertical work indoors; a focal plane shutter.

For projection the department has a stereopticon, used conjointly with the departments of Geology and Art. The lantern has both electric and vapor attachments for illuminant, and accessories for use of microscopical slides and live animals in water. There is a series of several hundred lantern slides, made largely from original negatives. Many of these are colored. The stock of negatives now numbers several thousand, and includes much valuable material. Each year the stock of negatives and slides is materially increased, and at the present writing there is a very creditable accumulation.

WORKING MATERIAL.

There is now on hand enough material for original investigations in several fields. The collection of Montana lepidoptera has been arranged, spread, and labelled, a total of about 3,500 specimens. The arrangement of the dragon flies has also been completed. There is yet much material to be worked out, within the ability of undergraduate students, and to which they will be directed as speedily as possible. The collections of working material are being constantly augmented. In addition to those mentioned under the head Museum there is a good series of marine alcoholics, containing both vertebrates and invertebrates, and a good collection of alcoholics from this region. For comparison in elementary work there is a collection of several thousand mounted slides, additions being constantly made. The Univer-

sity is situated under the shadow of Mt. Sentinel, altitude 6,000 feet. A few miles away Mt. Lolo rises to an altitude of 9,500 feet. The opportunities botanically and zoologically are excellent.

PLAN OF WORK.

The aim of the department is to bring the student into direct contact with the truths of nature. To do this there are lectures and recitations to give broad and general views, while in the laboratory each student is taught to get the facts for himself first hand. The rich new field in which the University is located gives students good opportunity for work.

In all laboratory work of the department the students work individually at separate tables. Each student is supplied with microscope, glassware, and necessary apparatus, the material being kept in the drawer space of the table. The material is charged to the student and he is held accountable for it. At the close of the semester when the material is returned, in good order, he is credited with the amount returned.

COURSES OF STUDY.

The following courses are offered for the year 1906-1907: for the year of required Biology the students may take Courses I and II, or V and VI.

COURSE I. GENERAL BIOLOGY.—An introduction to the study of living things. It is designed to illustrate by the study of a few organisms the fundamental structure and properties of living matter. A series of animal and vegetable forms is studied in the laboratory to harmonize with recitations. Two lectures and five hours of laboratory per week.

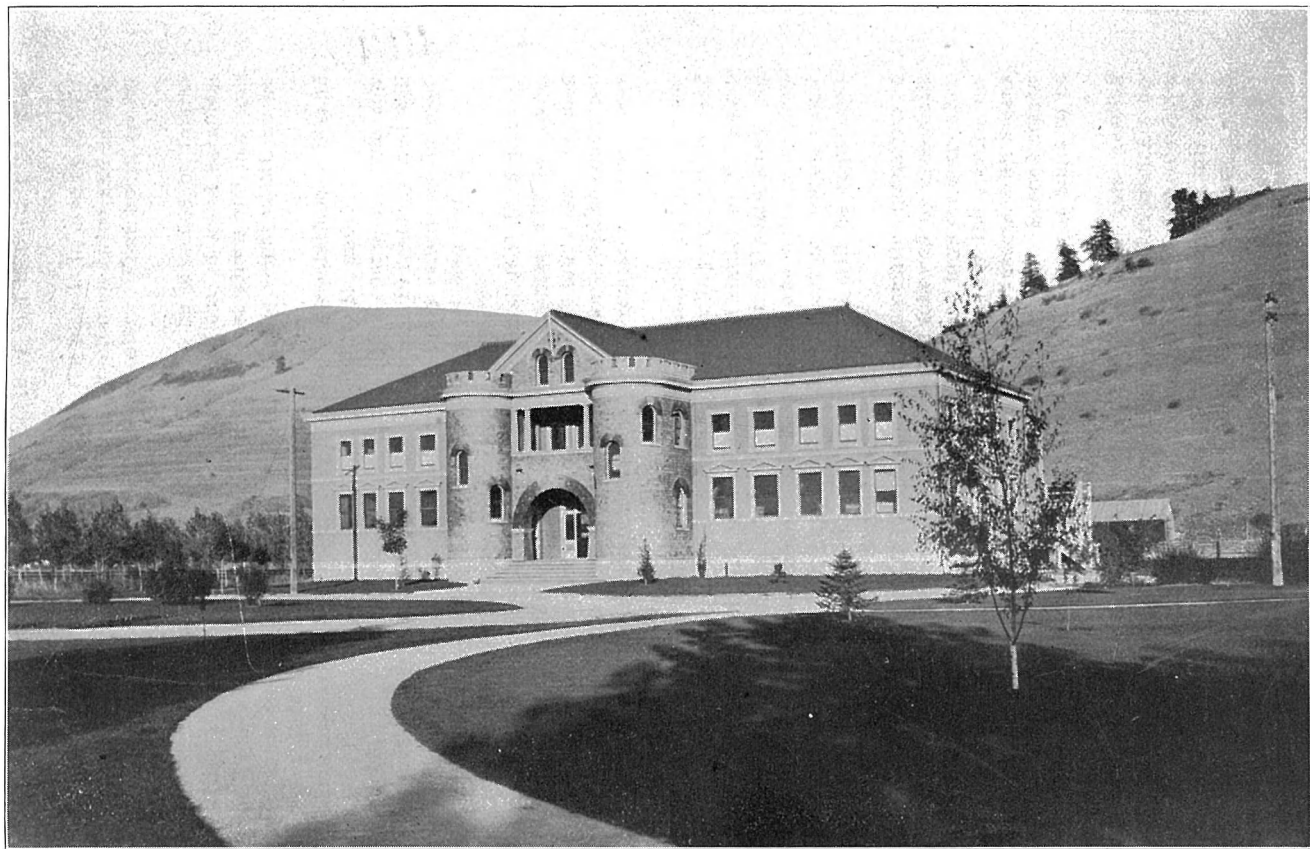
This course is required of all students. First semester. Lecture at 10:30 Tuesday and Thursday, laboratory from 1:30 to 4, two afternoons per week.

COURSE II. GENERAL BIOLOGY.—Continuation of Course I, and necessary for the completion of the work therein indicated. Second semester. Four hours credit. Lecture and laboratory at same hours as Course I.

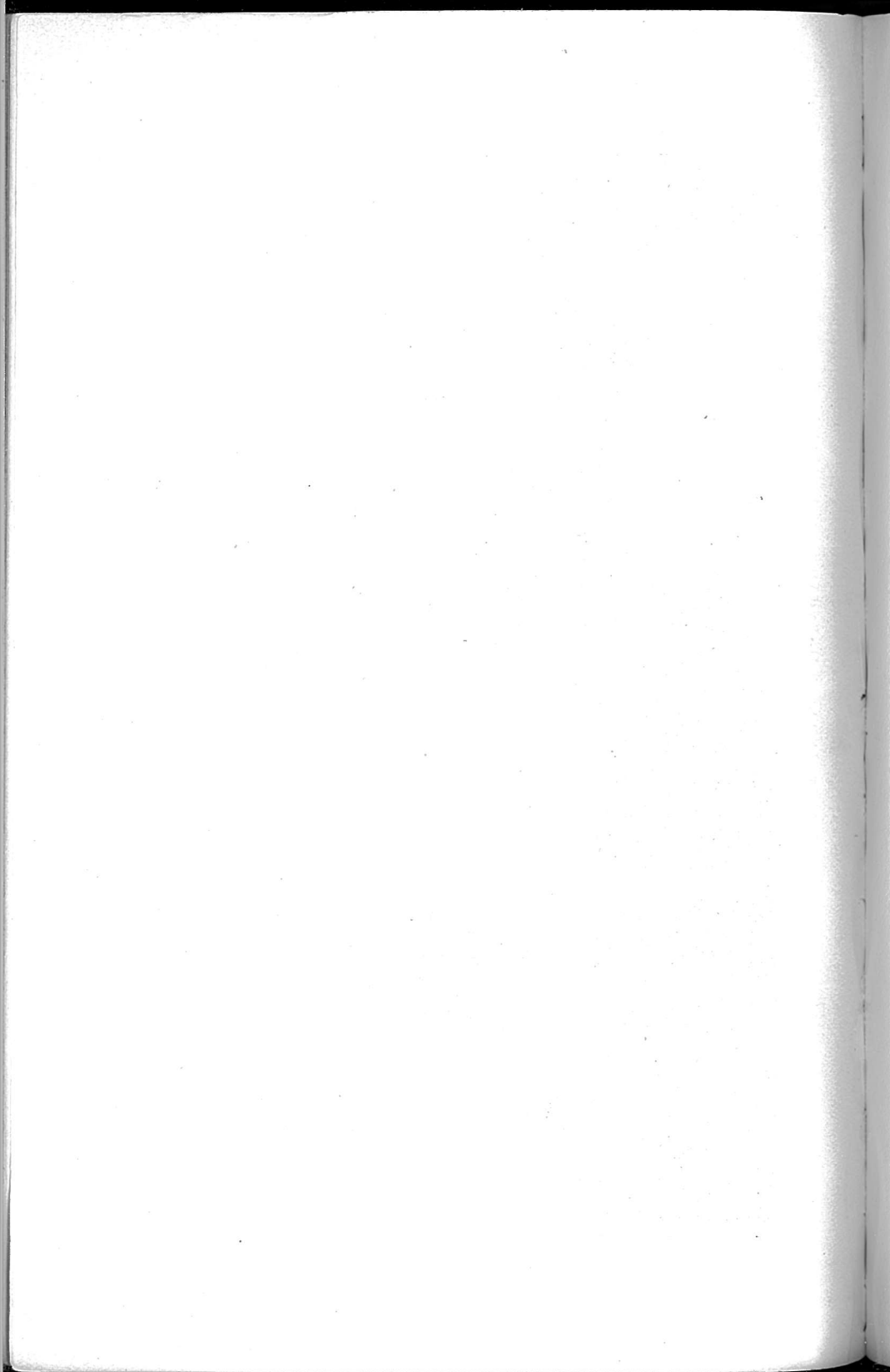
COURSE III. INVERTEBRATE ZOOLOGY.—A general course in the morphology and classification of Invertebrates. Laboratory and Class Work. Dissection of typical Invertebrates.

Lectures or recitations occur twice a week. In the latter Weyss's Zoology is taken as a basis for study. First semester. Four hours credit. Elective. Lectures or recitations at 8:30 Tuesday and Thursday. Laboratory, five hours, at times to be arranged.

COURSE IV. A CONTINUATION OF COURSE III.—Vertebrate Zoology. The dissections include Balanoglossus, Amphioxus, Trout, Frog,



GYMNASIUM--FRONT VIEW.



Cat, etc. Second semester. Elective. Lectures and laboratory at same hours as in Course III.

COURSE V. BOTANY.—In this course the plan is to give an intelligent idea of the scope of modern Botany. Recitation twice and laboratory practice five hours per week. First semester. Four hours credit. Recitations at 11:30, M., and F.

COURSE VI. SYSTEMATIC BOTANY.—To be preceded by Course V. The region near the University has a rich flora, of great botanical interest. The valley has an altitude of 3,225 feet above the sea, and plants may be had from this height to 9,500 feet, the height of Mt. Lo Lo some miles distant.

Laboratory and field work, with lectures or recitations. Second semester. Four hours credit. Recitations at 11:30 M., and F.

COURSE VII.—ORGANIC EVOLUTION.—This course is given conjointly by the departments of Biology, Geology and Psychology, and will consist of a series of lectures accompanied by library references for reading. Those entering the class will be expected to have had a year in Biology. Elective, first semester, T., and Th. at 11:30.

Courses VIII and IX will be under the instruction of F. W. Schule.

Course VIII. BACTERIOLOGY.—A general course will be given. The subject for discussion in the recitation room will follow that included in Newmann's and Fisher's Texts. The laboratory work will be conducted in the manner outlined in Frost's Manual. First semester. Four hours credit. T., and Th. 9:30.

COURSE IX. THE HUMAN BODY.—An advanced subject for mature students, requiring a good foundation in Biology, Chemistry and Physics. The work given will, in a general way, be similar to the course of study outlined in Martin's Advanced Course on the Human Body. In addition the skeleton and models will be studied, and outside readings assigned. The anatomy and physiology of the supporting tissues, motor tissues, nervous system, and metabolism in general will be considered. M., T., Th. and F. 10:30. Second semester.

COURSE X. ENTOMOLOGY.—A course in systematic entomology; a study of the anatomy and morphology of insects, followed by systematic study of the different orders, and families, with use of keys for determination of species. Comstock's Insect Life is the basis for the specific determinations. Special attention is given to injurious insects, with means employed for their control. Three or four hours credit. Second semester. Elective. Tuesday and Thursday at 8:30, laboratory at hours to be arranged.

COURSES XI and XII. RESEARCH WORK.—Under this heading additional study along biological lines will be outlined for students desiring it, considering both the demands of the students and the capacity of the department for carrying on the work. Those entering this work must have finished four of the preceding courses, and must have a reading knowledge of French and German. Laboratory work, ten hours per week for four hours credit, or twelve and one-half hours for five hours credit, with work in Seminary. One day each week will be devoted to reports on reading of current magazines, one to discussion of the work in

progress. Magazine reading at 9:30 Tuesday. Seminary 9:30 Thursday. Laboratory at hours to be arranged.

GRADUATE COURSES.

Graduate students applying for work will be given every facility for study. Individual work will be outlined, considering the facilities of the department and the previous work of the applicant. Problems in variation, ecology and histology are readily found, and candidates will be encouraged to pursue studies for which they are fitted and for which they have preference.

BIOLOGICAL STATION.

In addition to the courses here offered students are referred to the description of the work of the Biological Station, carried on under the direction of the Professor of Biology. The courses of summer work are open to all who may choose to attend, and credit on the University record is given for the amount of work satisfactorily completed during the summer.

Department of Free-Hand Drawing.

The aim of this department is (1) to give thorough instruction in drawing and painting, to teach as far as possible the technique of this work; (2) to inculcate by similar effort an appreciation of the difficulties and purposes of the great masters; (3) to foster a side of the students' nature usually neglected, to broaden his comprehension of ideal and spiritual beauty.

The arrangement of the courses follows the general trend of the best art schools. Care is taken that the work does not become narrow and mechanical, the desire being to foster originality, and breadth of understanding and of execution. As much freedom in the exercise of individual taste is allowed as is consistent with thorough work. It is expected, however, that all who undertake the courses offered will wish to study progressively and systematically.

Preparatory work, the equivalent of two and a half hours once a week for two years, is required of all students desiring collegiate courses in drawing and painting. These courses are given as free electives and the student may take from two and a half to five hours per week, credit being given according to the time spent.

The department is well equipped. It occupies a large and well lighted studio on the third floor of University Hall. Geometric solids, casts, and still life furnish ample material for elementary work; while fruit, flowers, and the draped model give opportunity for advanced study. The campus and surrounding landscape offer excellent opportunities for outdoor sketching.

Four lines of work are offered; Black and White Work, Water Color Painting, Oil Painting, and Design.

Three courses are given in the History of Art; the History of Architecture, the History of Sculpture, and the History of Painting. The library method is followed, the University Library being well supplied with the standard reference books in Art. The work consists of recitations and lectures illustrated by an excellent collection of photographs and the sciopticon. The study of the History of Art is conducive to culture and refinement and some course in it should be taken by all students. It gives an understanding of the emotional and spiritual life of man.

A course in Artistic Anatomy is offered and will be found profitable, and even necessary, to the student who intends to pursue the study of Art.

COURSES IN DRAWING AND PAINTING.

COURSE I. BLACK AND WHITE WORK. Elective. 2.

1. Drawing in charcoal from full length cast.
2. Drawing in pen and ink and wash from still life.
3. Composition.

COURSE II. BLACK AND WHITE WORK. Elective. 2.

1. Drawing in charcoal from full length cast.
2. Quick sketching from the draped model.
3. Out-door sketching.
4. Memory sketching.

COURSE III. BLACK AND WHITE WORK. Elective. 2.

1. Drawing in charcoal from draped model.
2. Quick sketching from model and interiors.
3. Newspaper illustration.

COURSE IV. BLACK AND WHITE WORK. Elective 2.

1. Work from draped model and interior in any medium.
2. Drawing from landscape and street scenes.
3. Costume Studies.
4. Magazine illustration.

COURSE V. WATER COLOR PAINTING. Elective. 2.

1. Painting from still life.
2. Painting from flowers.
3. Painting from fruit.

COURSE VI. WATER COLOR PAINTING. Elective. 2.

1. Painting from flowers and still life.
2. Out-door sketching.
3. Composition.

COURSE VII. WATER COLOR PAINTING. Elective. 2.

1. Drawing in charcoal from full length cast.
2. Painting from draped model.
3. Painting from landscape.
4. Posters.

COURSE VIII. WATER COLOR PAINTING.. Elective. 2.

1. Drawing in charcoal from human head.
2. Painting from human head.
3. Painting from landscape.
4. Painting from draped model and interiors.
5. Costume Study.

COURSE IX. OIL PAINTING. Elective. 2.

1. Painting from still life.
2. Painting from fruit and still life.

COURSE X. OIL PAINTING. Elective. 2.

1. Painting of flowers and still life.
2. Sketching and painting from landscape.
3. Composition.

COURSE XI. OIL PAINTING. Elective. 2.

1. Drawing in charcoal from full length cast.
2. Painting from draped model.
3. Painting from landscape.

COURSE XII. OIL PAINTING. Elective. 2.

1. Drawing in charcoal from the human head.
2. Painting from the human head.
3. Painting from landscape.
4. Painting from model and interiors.
5. Costume Study.

COURSE XIII. DESIGN. Elective. 2.

1. Principles of design.
2. Lettering.
3. Patterns.
4. Book covers.

COURSE XIV. APPLIED DESIGN. Elective. 2.

1. Principles of design.
2. Design variously applied.
3. Designing in leather.

COURSE IN THE HISTORY OF ART.

COURSE I. HISTORY OF PAINTING. Elective. 2.

COURSE II. HISTORY OF ARCHITECTURE. Elective. 2.

COURSE III. HISTORY OF SCULPTURE. Elective. 2.

COURSE IN ARTISTIC ANATOMY.

COURSE I. ARTISTIC ANATOMY. Elective. 2.

School of Mechanical Engineering.

The School of Mechanical Engineering has been especially designed to meet the growing demand in the State of Montana for bright energetic young engineers to cope with the vast problems which must be solved before the unlimited resources of the state can be fully developed. To this end the Engineering Laboratories have been designed to offer facilities for tests and experimental inquiry, such as (1) submitting to actual test, and verifying directly, principles developed in the lecture-room; (2) building and testing machinery designed by the students; (3) investigating such subjects and engineering problems as are calculated to impart training in methods of investigation, and to yield results, which may prove of value in engineering science; (4) ascertaining the character and proper treatment of materials, and acquiring familiarity with the appliances and processes necessary for the construction of designs. Opportunity is afforded the student to acquire skill in the working of metals by hand and

machine tools, in wood-turning, planing, and carpentry, in moulding and pattern-making, in forging and tempering tools. These processes are well illustrated in the construction of machines for experimental work. After the student has become sufficiently acquainted with these processes, and is able to recognize the differences in appliances and methods, visits of inspection are made to manufacturing establishments and power stations in the vicinity, in order to give him familiarity with engineering operations on a large scale.

The quarters in Science Hall devoted to Mechanical Engineering consist of the following: Mechanical drawing room and office on the first floor of the two story front of the building; wood shop, machine shop, forge shop and foundry, located in the two-story extension of the building; and the engine room, located in the basement under this extension.

The draughting tables are located in a well lighted room 23x34 feet in size. The office of the Professor of Mechanical Engineering is adjacent to it. Fourteen drawing tables furnish accommodations for twenty-eight students. A library of over two hundred volumes of standard works, as well as a large number of engineering catalogues, pamphlets, etc., furnish the student with valuable references.

Passing from the hall of the front part of the building into the two-story extension above referred to, the wood shops, forge shops, and foundry, occupy rooms, in the order mentioned. The wood shop is 30x40 in size, and is well lighted on both the north and south sides. Work benches with vises and tool cupboards, furnish accommodation for ten students at bench work, while ten lathes of 11-inch swing enable an equal number to engage in wood turning. There is also an excellent wood turning lathe of 16-inch swing and 12-foot bed, with double-ended spindle, for turning large work. A double circular sawing machine, with cross-cutting and rip saws. A scroll saw, a wood trimmer and a grindstone complete the equipment of this shop.

The machine shop is adjacent to the wood shop. It is 30x27 1-3 feet in size, and is lighted from both north and south sides.

The equipment comprises one 16-inch by 8-foot engine lathe, with taper-turning attachment, chuck, large and small face plates, a 32-inch swing drill press, a sensitive drill, a 16-inch stroke, shaper, a power hack saw, a wet emery grinder, a double emery grinder, and benches with four machinist's vises.

The forge shop opens off the machine shop. It is 30x30 feet in size. Eight Buffalo down draft forges are placed in this shop, and a Buffalo combination blower and exhaust fan furnishes blast and carries off the smoke. There is also a small portable forge with blower attached. A combination shearing and punching machine, and a complete outfit of anvils, hammers, tongs, and other necessary tools, complete the equipment of this shop.

The foundry also opens off the machine shop. It is a well lighted room, 30x30 feet. The equipment consists of a No. 0 Whiting Cupola, a Sturtevant steel pressure blower, core oven, core making bench, and the small tools and supplies needed.

In the machine shop there is partitioned off a small tool room, Here are kept all the small tools, such as calipers, taps, scales, etc., for the machine shop, and also many tools for the wood shop. Also a complete stock of supplies, such as machine and wood screws, sand paper, etc., is conveniently stored. A checking system enables the instructor to give out these tools for student's use, without danger of their being lost or mislaid.

It is the purpose of this department to give the student a thorough training in those branches of science that underlie the profession of Mechanical Engineering, as well as technical instruction in the practical lines of shop practice, mechanical drawing, and machine design.

Below is given the special work required in this department. For the general work, and for the arrangement of the work according to years, see the Course of Study of the School of Mechanical Engineering. The hours per week given are the number of hours credit, each one of which requires one hour's work in recitation or lecture, or two and one-half hours in laboratory, shop or drawing room.

STEAM ENGINEERING.

A 50-horsepower Automatic Atlas engine, located in the basement, furnishes power for the shops. This engine is used for testing purposes by the students in steam engineering. The department is furnished with a Prony brake, two improved Crosby indicators with a reducing wheel and also a pantagraph, one improved Crosby steam gauge tester, speed counters and all necessary attachments for taking power, steam consumption, etc.

ELECTRICAL ENGINEERING.

Equipment has been added during the year for those students who wish to specialize in Electrical Engineering.

During this time there has been added the following complete equipment for electrical testing and alternating current work. A full set of Weston standard measuring instruments consisting of voltmeters, ammeters, wattmeters, etc. Three static transformers for tests in single, two and three phase circuits. A two and three phase induction motor, a synchronous motor, a rotary converter and direct current dynamo for electrolytic testing, etc.

Belt-connected to the Atlas engine is a 125-light 6250-volt Brush Arc Machine. For alternating current work connections are made to the city supply circuit. Through the generosity of the Missoula Light & Power Co. the department has been presented with many forms of ammeters, voltmeter, wattmeters, etc., for electrical testing work in addition to the above.

CIVIL ENGINEERING.

For those students who wish to specialize in Civil Engineering work, the department is well supplied with an excellent surveying outfit, consisting of a transit, Y level, compass, planimeters, solar attachments, leveling rods, chains, tapes, etc.

SHOP WORK.

Instruction in shop work is given in the afternoon throughout the freshman and sophomore years, and a half year in the junior and senior work. There are three shop periods per week of two and one-half hours each.

I. FRESHMAN SHOP WORK.—During the first semester attention is given to acquiring a knowledge of the use and care of tools in this shop. A systematic course of exercise has been laid out to accomplish this, involving the use of the tools at the disposal of the student. On the bench, the exercises in carpentry consist in sawing, planing, joining, splicing, mortising, dovetailing, framing and paneling. On the lathe exercises are given in the turning of cylinders, cones, beads, ogee curves, etc., and chucking and face turning. The last four weeks of this semester will be devoted to pattern making.

In the second semester pattern making is continued. This work consists in making patterns of machine parts, and also core boxes for the same should they be required. The making of patterns involves a knowledge of both lathe and carpentry work and requires careful and accurate workmanship. A portion of the time in this semester is given to molding and casting. This work is designed to give a general knowledge of foundry practice, and includes making of molds in green sand, core making, and charging and operating in cupola furnace.

During part of each period lectures are given in the use and care of tools, and in the elements of wood construction. Lectures are also given on the elements of pattern making, followed by a description of a va-

riety of representative pieces of pattern construction.

Seven and one-half hours throughout the year; 3 units per half year. Prescribed Freshman year.

II. SOPHOMORE SHOP WORK. Molding and casting is continued for the first six weeks, and followed by twelve weeks of iron and steel forging. Exercises in drawing out, upsetting, welding, punching, and forming, are followed by a course in steel working and the forging and tempering of tools.

The latter part of the semester's work is in the machine shop. The work consists first, of exercises in vice work, involving practice in the use of hammer and cold chisel, file and scraper; and second, of exercises designed to give practice in the working of the various machine tools. The preliminary exercises are followed by work on complete machines.

Part of each period is taken up in lectures on the use of tools such as hammers, cold chisels and files. The engine lathe and other machine tools are described, and various shop processes and operations are given, the purpose being to give the student such knowledge of shop practice as would be most likely to be useful in his future work.

Seven and one-half hours second semester; 3 units per half year. Prescribed Sophomore year. Pre-requisite Course I.

III. JUNIOR AND SENIOR SHOP WORK.—During the junior year and first semester of the senior years, machine practice is continued. Additional practice is given in the use of lathe, shaper, and other machine tools. Various machines designed by the students will be built.

Five hours throughout the year; 2 units per half year. Prescribed Junior and Senior years.

DRAWING.

I. INSTRUMENTAL DRAWING.—Instrumental drawing, solving of geometrical problems, cross-hatching, line shading, drawing from copy, and orthographic projection. In the second semester drawings to scale are made of simple machines and machine parts.

Five hours throughout year; 2 units. Prescribed, Freshman year.

IIA. DESCRIPTIVE GEOMETRY.—The correct representation of the point, line, plane and solid space; sections and intersections of various geometrical figures.

Five hours first half year; 2 units. Prescribed Sophomore year.

IIB. DESCRIPTIVE GEOMETRY.—Shades and shadows, isometric projection.

Five hours second half year. Prescribed Sophomore year. Pre-requisite Course IIA.

III. MECHANICAL DRAWING.—Drawing of simple machine parts complete sets of working drawings are made of existing machines. The necessary sketches and measurements are first made of existing machines, thus gaining additional training in free-hand drawing, and from these sketches the finished drawing is made.

Five hours second half year. Prescribed Sophomore year. Pre-requisite Course I.

IV. MACHINE DESIGN.—Elementary Machine Design. This work

consists of the designing of such elementary machine parts as fastenings, riveted joints, keys, journals, bearings, etc. Both rational and empirical formulas are used, and standard authorities are consulted.

Five hours first half year. Prescribed Junior year. Prerequisite Courses I and III.

V. STEAM ENGINE DESIGN.—Continuation of Course IV. In the latter part of the year the work in steam engine design is commenced. A series of ideal indicator diagrams are drawn so as to give diagrams of actual force transmitted to crosshead and crank pin.

Five hours second half year; 2 units. Prerequisite Course IV.

VI. GRAPHIC STATICS.—General theory of graphic statics with applications. Graphical analysis of stresses in Engineering structures, and includes the designing of engineering structures, such as roof-trusses, bridges, etc.

Five hours first half year; 2 units. Prerequisite Course II.

VII. ELECTRICAL DESIGN.—This work consists in the design of simple parts in electrical machinery.

One hour lecture, 3 hours drawing; 2 units.

MECHANICAL ENGINEERING.

I. ANALYTICAL MECHANICS.—The mathematical treatment of the important principles of dynamics and statics, fully illustrated by problems and applications. Hoskins' Analytical Mechanics is used.

Four hours throughout the year; 4 units per half year. Prerequisite, Courses III and IV in Mathematics and Course I in Physics.

II. HYDRODYNAMICS.—Investigation of the action of forces producing equilibrium or motion in liquids; pressure, stability, flow, etc., as affected by gravity, inertia, outer and inner friction. General theory and construction of hydraulic motors and pumping machinery.

Three hours first half year. Prescribed Senior year. Prerequisite Course I.

III. HYDRAULICS AND HYDRAULIC MACHINERY.—Discussion of such machines and apparatus as operate through the agency of fluids, either in modifying motion or transmitting power.

IV A. THERMODYNAMICS AND THE THEORY OF THE STEAM ENGINE.—Mechanical theory of heat, thermodynamics of gases and vapors, and the theory of the steam engine; discussion of the effects of compounding, jacketing and superheating; efficiencies of the steam engine.

Three hours first half year. Prescribed Senior year. Prerequisite Course I.

IV B. CONSTRUCTION AND OPERATION OF HEAT ENGINES.—Power plant equipment; construction and operation of steam, gas, oil and air engines, boilers, refrigerating machines, air compressors, steam turbines, etc.

Three hours second half year. Prescribed Senior year. Prerequisite Course I.

V A. KINEMATICS.—Theoretical: Treatment of motion without reference to the cause which produces it, comprehending the study of

pure mechanism, or the mutual dependence of the movements in the parts of a machine. Applied: Application of the preceding to the various kinematic problems connected with machine design and construction, such as link motion, transmission by rolling and sliding contact, teeth of wheels, cams, form and proportions of the steam engine and other motors.

Two hours throughout the year. Prescribed Junior year. Prerequisite Course I.

VB. KINEMATICS.—Draughting and designing.

Two and one-half hours second half year; 1 unit. Prescribed Senior year. Prerequisite Course I.

VIA. SURVEYING.—Theory of surveying; modern surveying instruments; methods employed in topographic, land, city, mining, and hydrographic surveys, and in making maps and calculations from field-notes. Full illustration by practical problems. Lectures and recitations.

Three hours throughout the year. Prescribed Sophomore year.

VIB. FIELD PRACTICE AND MAPPING.—The adjustment of surveying instruments in the field; taking of notes for plane and topographical surveys and making of maps from them to illustrate the theoretical work of the class-room. Completed maps of all surveys will be required.

Seven and one-half hours first semester; 3 units per half year. Prescribed Sophomore year.

VII. STRENGTH OF MATERIALS.—Discussion of the elastic and the ultimate resistance of the materials used in construction; of the first methods in designing parts of structures, such as suspension rods, pillars, girders and shafts; and of parts of uniform strength. Lectures and problems.

Four hours second half year. Prescribed Junior year. Prerequisite. Thoroughly satisfactory standing in the first half year of Course I.

VIIA. LEAST SQUARES.—Mathematical discussion and treatment of errors arising in engineering work. Solution of problems, computing the probable error, mean values, etc.

Two hours first semester; 2 units Prescribed Junior year. Prerequisite Courses I, II, III, IV in Mathematics.

VII B. DIFFERENTIAL EQUATIONS.—Solutions of equations involving differentials arising in strength of materials and especially those involved in the theory of electrical phenomena.

VIII. MECHANICAL LABORATORY, EXPERIMENTAL ENGINEERING.—Experiments in steam engineering, hydraulics, testing of machinery, materials, etc.

Five hours first half year; 2 units. Prescribed Senior year.

IX A. ELECTRICAL MACHINERY AND CONSTRUCTION.—Discussion of the construction and operation of electrical machinery and its application to electric lighting and power distribution. The location and construction of electric lighting and power systems for cities, street railways and mines.

Two hours second half year. Prerequisite Mathematics IV and V. Prescribed Junior year.

pure mechanism, or the mutual dependence of the movements in the parts of a machine. Applied: Application of the preceding to the various kinematic problems connected with machine design and construction, such as link motion, transmission by rolling and sliding contact, teeth of wheels, cams, form and proportions of the steam engine and other motors.

Two hours throughout the year. Prescribed Junior year. Prerequisite Course I.

VB. KINEMATICS.—Draughting and designing.

Two and one-half hours second half year; 1 unit. Prescribed Senior year. Prerequisite Course I.

VIA. SURVEYING.—Theory of surveying; modern surveying instruments; methods employed in topographic, land, city, mining, and hydrographic surveys, and in making maps and calculations from field-notes. Full illustration by practical problems. Lectures and recitations.

Three hours throughout the year. Prescribed Sophomore year.

VIB. FIELD PRACTICE AND MAPPING.—The adjustment of surveying instruments in the field; taking of notes for plane and topographical surveys and making of maps from them to illustrate the theoretical work of the class-room. Completed maps of all surveys will be required.

Seven and one-half hours first semester; 3 units per half year. Prescribed Sophomore year.

VII. STRENGTH OF MATERIALS.—Discussion of the elastic and the ultimate resistance of the materials used in construction; of the first methods in designing parts of structures, such as suspension rods, pillars, girders and shafts; and of parts of uniform strength. Lectures and problems.

Four hours second half year. Prescribed Junior year. Prerequisite. Thoroughly satisfactory standing in the first half year of Course I.

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Two hours first semester; 2 units Prescribed Junior year. Prerequisite Courses I, II, III, IV in Mathematics.

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VIII. MECHANICAL LABORATORY, EXPERIMENTAL ENGINEERING.—Experiments in steam engineering, hydraulics, testing of machinery, materials, etc.

Five hours first half year; 2 units. Prescribed Senior year.

IX A. ELECTRICAL MACHINERY AND CONSTRUCTION.—Discussion of the construction and operation of electrical machinery and its application to electric lighting and power distribution. The location and construction of electric lighting and power systems for cities, street railways and mines.

Two hours second half year. Prerequisite Mathematics IV and V. Prescribed Junior year.

IX B. ELECTRICAL MACHINERY AND CONSTRUCTION.—Continuation of Course IX A.

Two hours first half year. Prescribed Senior year.

X. ALTERNATING CURRENT AND ALTERNATING CURRENT MACHINERY.—The theory of the generation of single-phase and poly-phase alternating currents, the use of the complex quantity, and the calculation of the regulation and behavior of alternating-current apparatus and transmission lines. In the latter part of the year is taken up, the theory of the single-phase and poly-phase induction motor, synchronous motor and rotary converter, and their effects and operation in transmission lines.

Four hours throughout the year; 4 units per half year. Prescribed Senior year. Pre-requisite Course I and III in Physics.

XI. MECHANICAL ENGINEERING SEMINARY.—Critical discussion of special mechanical and electrical installations. Special tests and laboratory work.

Hours and credit value to be arranged. Primarily for graduates.

XII. THESIS.—A candidate for a degree in the mechanical engineering course is required to write a thesis upon some subject in Mechanical or Electrical engineering.

Department of Music.

The Department of Music of the University of Montana provides instruction in vocal and instrumental music and opportunities for the study of chorus work.

One of the principal features is the Pianoforte School, which is in a very satisfactory and encouraging condition, both as regards number of students and their proficiency. The school is divided into Upper and Lower, and each of these again into two grades, Senior and Junior. The Juniors of the Lower School use as studies the New England Conservatory Method, Bertini's Czerny's or Heller's Easier Exercises, little pieces by Bach, Reinecke, Gurlitt and others.

The Seniors continue the above with scales in similar and contrary motion, and major arpeggios of the common chord. More advanced pieces are given.

In the Upper School the work of the Junior grade comprises scales in thirds, sixths and tenths, similar and contrary motion, major and minor chord arpeggios. Cramer's Etudes, Czerny's Virtuosen Schule, and Clementi's Gradus ad Parnassum. The Senior grade, in addition to the above, takes Arpeggios of the Dominant and Diminished Sevenths and studies by Chopin, Henself, Moscheles and others.

Exercises are given in sight reading elementary harmony, ear tests and history of music.

Public recitals are given by the students three times in each year, and have proved of great service in encouraging effort and overcoming nervousness.

Two free scholarships are held at present by Miss Grace Corbin and Miss Zona Shull. A medal is presented yearly for the most proficient player in advanced technic. Other medals are awarded by the director.

One lesson, weekly\$20 the Semester
Two lessons, weekly\$40 the Semester

Department of Physical Culture.

EXERCISE FOR MEN.

The work for the men consists of exercises with Indian clubs, dumb bells, and parallel bars; and, in addition, some attention is given to Swedish Gymnastics, tumbling and Corrective Gymnastics. The object is to build up the weaker parts of the body, enlarge the thorax and form correct carriage. The younger students are given light work and elementary exercises, while the older students are given heavier work and more complicated exercises. All students in the Preparatory Department and in the first and second collegiate years are required to take two hours of gymnasium work per week. One-half hour credit is given each semester for this work.

The light Gymnastics consist of exercises with Indian clubs, dumb bells, and ordinary military set-up exercises; while the heavy gymnastics consist of Swedish gymnasium work, corrective gymnastics, and chest-weight and parallel bar work.

EXERCISES FOR WOMEN.

The work in this department is made as practical as possible. The aim is to make the Gymnasium practices progressive, and systematic. General development of the body, a correct carriage, ease and grace of movement, and a correct method of breathing are the objects in view.

Two hours per week in the gymnasium are required of all young women in the Preparatory school and for two years in the College. Preparatory gymnasium, Tuesday and Thursday at 11:30. Collegiate gymnasium at 2:30.

Biological Station.

OSCAR J. CRAIG, M. A., Ph. D.,
President of the University, Lecturer.

MORTON J. ELROD, M. A., Ph., D.,
Director, General Zoology, Plankton Methods.

THOMAS A. BONSER, M., S.,
Spokane High School, Botany.

P. M. SILLOWAY,
Superintendent of Schools, Lewistown, Bird Study.

C. H. SCHERF, M. S.,
Flathead County High School, Physiography.

GERTRUDE P. NORTON,
East Helena, Nature Study, Artist.
Postoffice, Bigfork, Flathead Co., Montana, July 1 to September 1.

COURSES OF STUDY FOR 1905.

The laboratory work of the Station for 1905 will open Wednesday, July 11, and continue five weeks, or until Thursday, August 16.

For a week or ten days before the Station opens and for two or three weeks after the work closes some one of the Station staff will be at or near the Station, and will aid any who may choose to work during such time. The laboratory is at the disposal of students, if it is wanted, from June 15 to September 1.

EQUIPMENT.

The Station is located on the bank of Swan River at its outlet into Flathead Lake. It was established in the spring of 1899.

The laboratory is a one-story frame structure, 18x24, containing a small store room, a dark room, and tables for twelve students. It is substantially built, well lighted, and well suited to outdoor work.

The Station is in possession of three boats for use in the work: a gasoline launch "Missoula," a row boat "Culex," and a canvas boat "Daphnia." These boats enable the Station force and those attending to get around very nicely. In addition to the above the Station is in possession of numerous smaller pieces of material: a pump after plans of Ricker, plankton net after plans of Kofoid, insect nets, dredges, camp material, and other necessary appliances are supplied for the work. Microscopes, chemicals, glassware, and books are taken annually from the University for use at the Station.

PURPOSES OF THE STATION.

To serve as a field for research work in Botany, Zoology and Geology. To offer research work to candidates for a degree, such work being accepted by the University of Montana. To furnish a general course to college students, or to those preparing to teach. To make a place for high school students where they may be permitted to work under the most favorable opportunities. To afford opportunity to teachers to collect material for class use and for their own laboratories. To provide lectures, field excursions, and laboratory exercises so as to give the best insight into the proper method of nature study. To see some of the grandest scenery in the world, and to receive the inspiration felt by those who see grand panoramas. To offer a place where healthful recreation may be had, free from care, under inspiring conditions, accompanied by an environment stimulating observation and investigation. To offer a place where kindred spirits in the state may meet and exchange ideas and by his friendly meeting receive added stimulus and enthusiasm for work.

LOCATION.

The University of Montana Biological Station was opened in 1899. For the past seven summers the station has been occupied from June until September or October. During this time some fifteen states have been represented. The station has become well known to many American naturalists, and all are enthusiastic in their praise of opportunities afforded in the vicinity of Montana's large inland lake.

For scenery the vicinity cannot be surpassed. Few places offer more varied points of interest. The roaring rapids of Swan river are at the door of the building. Flathead Lake, covering more than 300 square miles of territory, with its beautiful islands and precipitous shores, has great attractions. The Mission range, beginning on the burnt hills by the laboratory, and rising higher and higher as they extend southward, culminate in snow-capped peaks 10,000 feet in height. A few miles to the east is the Swan range, its high summits constantly in view. These two mountain ranges afford some of the most beautiful panoramas to be seen in the Rocky Mountains, and rival the Alps in magnificent scenery. Farther to the east, reached in a short time by pack train, the main chain of the Rocky Mountains

breaks the horizon with lofty peaks and precipitous summits. Untrod summits invite the courageous naturalist who seeks the unknown animal and vegetable life. West of Flathead Lake are the almost unexplored Cabinets. Within a few miles are many lakes, Swan, Echo, Rost, and others, while many ponds and swamps are in the immediate vicinity. The waters of Swan and Flathead rivers supply Flathead Lake, the former at the laboratory door, the latter but two miles distant. East and south of the Laboratory the forests extend unbroken for a hundred miles, with here and there a settler's cabin. Such a combination of lakes, rivers, mountains, forests, at elevations from 3,000 to 10,000 feet, one will find in few places in America.

The present site of the Station was chosen because of the advantages mentioned above. The seaside will always have its attractions and its devotees. But there are those who love the mountains, who delight in craggy heights, and who find abundance of material for study because it is new and the field unexplored. There are many who cannot take long trips to the seashore, others who wish to spend a summer on the inland lakes, in the primeval forest and among the snow-clad hills. Then there is the home field. Montana needs a wider dissemination of knowledge of outdoor study. Here may be had healthful recreation, beautiful surroundings, congenial associates, and rare opportunities for observation and study.

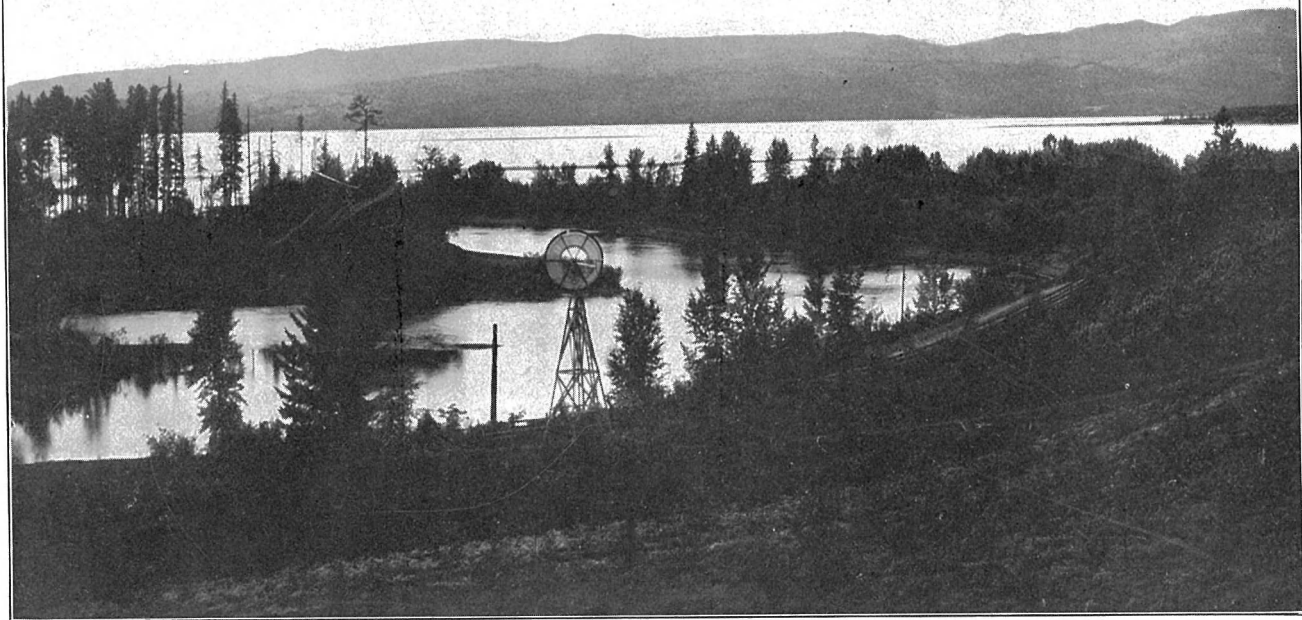
The climate is delightful. Rarely does it rain in July and August. In the shade it is always pleasant. Long trips may be planned without danger from the elements. One may sleep out without fear. In a day from the laboratory one may reach huge snowbanks in middle August. There is an abundance of sunshine, no fogs nor dreary days and few days of excessive heat.

Further information in regard to the station and its work may be found in the bulletins mentioned later in this circular, and in the following publications: *Journal of the New York Botanical Garden*, January, 1902, pp. 8-13; *Journal of Applied Microscopy*, Vol. IV, No. 5, pp. 1269-1278; *Science*, N. S., Vol. XX, pp. 205-212; *Rocky Mountain Magazine*, Vol. IV, No. 4, 1901, pp. 781-787.

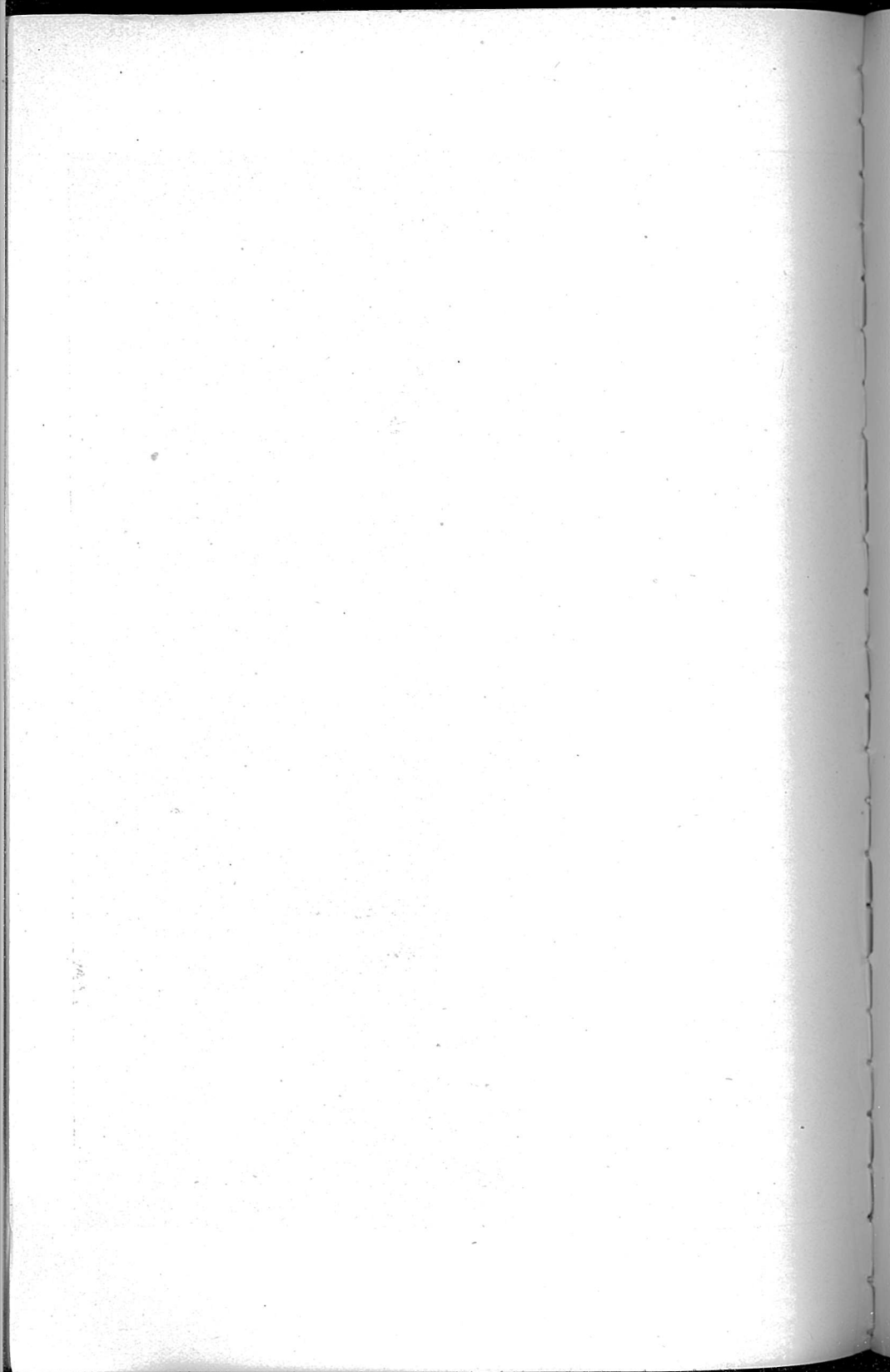
COURSES OF STUDY FOR 1906.

The following scheme will give those who wish to attend an idea of the kind and character of the work that may be done.

ZOOLOGY. (a) General zoology, principally field work, instructions



BIOLOGICAL STATION, BIG FORK.



in methods of study and observation, illustrating the influence of environment. An observation study, full of suggestion, very helpful to those who have had no such opportunity for study. Material will be collected and worked up in the laboratory.

(b) Field and laboratory course in entomology. Instruction in collecting, preserving and labelling insects. Dissection and study of type specimens. A study of injurious insects.

(c) Ichthyology. Special course devoted particularly to the lake study.

(d) Ornithology. A study of birds, with methods of collecting, making and preserving skins; habits and lives of birds of the rich avian region adjacent.

BOTANY. (a) Laboratory and Field Course: Study of type forms of Algae, Fungi, Lichens, Bryophytes, Pteridophytes, and Spermatophytes. Especial attention will be given to the Conifers of the vicinity. There will also be collecting trips in the field, where the various type forms may be found. In the laboratory, attention will be given to the classification of the more common species, to the study of Plant Morphology, to the methods of preparation of Herbarium specimens, and to the methods of preservation in liquids for immediate or permanent use.

(b) **ECOLOGY.**—A general course including local ecological problems, and local plant geography. This region offers quite a diversity in plant societies.

PHOTOGRAPHY.—The region offers rare opportunities for this branch of study. The work will include a study of lenses, plates and developers. The use of the ray filter will be explained, and the many errors which may fall to the lot of the beginner will be pointed out. The course will include the selection of subject, development, printing on one or two kinds of paper and transparencies.

Students in photography must supply their own plates or films and paper. There is a dark room at the laboratory and the scenery in the vicinity gives ample scope for a series of negatives either in landscape or of scientific subjects.

NATURE STUDY.—A course of study and practical work will be outlined, which will afford both a fund of information on which to draw during school work and at the same time secure a collection of material to be used in illustration. The scope of the work will include zoology, botany, geology, and physiology of the region.

PHYSIOGRAPHY.—This subject is receiving more attention than formerly. Those who desire such work will be given methods which may be used in any locality, and by excursions will be shown how to carry on observations. The course will include the surface geology, drainage, climatic conditions, and effects of vegetation.

SPECIAL WORK.—Students and investigators will be encouraged to pursue some special study, taking such problems as may be pursued with profit during the session.

It must be understood that while the daily lectures are given to all yet each individual works alone, pursuing such study as may be best fitted to his ability and requirements. The beginner has the same op-

portunity as the advanced student. Realizing that study of biological subjects is not extensive in the state, preparation is made for those who have not pursued such study.

METHODS OF INSTRUCTION.

The work will consist very largely of field collecting and observation, study of relation to environment, supplemented by laboratory dissections and microscopic examination. The general courses will enable teachers to familiarize themselves with methods of field work, and give a store of information from which to draw in nature study subjects. The general courses also give opportunity to students and others to pursue lines of study with better facilities for outdoor work, with fresher material, than is generally to be had in regular university work.

LECTURES.

During the session the lectures following will be given at the laboratory. They will be given daily, at least one each day. The list will probably be increased, and may be slightly modified. They are free to all students attending, and to any others who desire the privilege. The following lectures, with others, will be delivered:

- Instinct and Intelligence in Animals.
- Debt of Science to Lewis and Clark, with stereopticon.
- The Forests of the Flathead Valley.
- The Geology and Natural History of Flathead Lake.
- Montana's Agricultural Water Supply, with stereopticon.
- Studies in Alpine Life, with stereopticon.
- The Mosquito Problem.
- The Place of Field Work in Scientific Study.
- The Mission Mountains, with stereopticon.
- Evolution of Plant Forms, with stereopticon.
- Evolution of Plant Reproduction, with stereopticon.
- Elementary Forestry.
- Plant Societies of the Northwest.
- The Coniferae.
- Seed Dispersal.
- The Ancient History of America.

FEES AND EXPENSES.

There are no tuition fees. Students attending will be charged for material consumed, for breakage, for a share of the expense for excursions, and like necessary expense. Necessary books, chemicals, microscopes, and glassware will be supplied free. The intention is to give the best facilities possible, so as to make it worth while for students to attend.

BOARD AND ROOM.

Day board may be had at \$4.50 to \$5.00 per week, room extra. It is customary for most of those attending to sleep in tents, on the Station grounds, taking meals only. For those who wish to tent and cook in regular camp style, there will be every opportunity given for comfort, the region affording a bountiful food supply of everything necessary, but those attending will be expected to supply their own tents and bedding.

OPPORTUNITIES FOR INVESTIGATION.

Any one wishing to engage in investigation of biological problems pertaining to the life of the locality, before or after the regular work, will be given the freedom of the building, boats and apparatus, and will be afforded every facility possible. In such cases no fees will be charged, except for special material or reagents which may be needed.

RECREATION.

Many will wish to combine an outing with study. Fishing near the laboratory is excellent. There are many boats besides those of the Station, and rowing may be indulged in. The field is excellent for photography. Bathing in the lake is always a treat and the beach is fine. The region has an abundance of fruit of all kinds. The hills and forests afford quiet retreats for study or for strolls. Few places have more natural attractions. At the proper season hunting is good. Deer have been seen a few rods from the laboratory. Grouse and pheasants abound in the hills. In season duck shooting is fine. Most of the country affords good wheeling for bicycles.

EXCURSIONS.

The following excursions will be taken during the session of 1905, unless the weather is unfavorable:

1. A trip to Swan Lake, through the forests, with stop over night at the lake. This is a beautiful lake in the mountains, of great interest biologically and geologically.
2. A trip to Rost Lake, at the base of the Kootenay Mountains. This is a lake almost filled up, a fine collecting field. It is an admirable location for camps.
3. An ascent of MacDougal Peak via an Indian trail, to an altitude of 7,725 feet. This will afford opportunity for alpine collecting, and will present some of the most sublime scenery in the world.

4. A trip around Flathead Lake, making study of its banks. These trips will be under the personal supervision of the Director of the Station. Those taking the trips must bear a proportionate share of the expense necessary. Such trips will prove of great value and interest biologically aside from the pleasures they bring. These trips are not for mere pleasure, but are held for the purpose of collecting material and observing living things in their natural environment. Students are required to report on observations and to make suggestions.

THE STATION IN THE FUTURE.

By act of Congress at the last session a tract of one hundred and sixty acres of land in the Flathead Indian Reservation was set aside for the University of Montana Biological Station. When the Reservation is surveyed and the allotments made to the Indians the selection of land will be made and the Station will have a permanent home.

Collegiate Courses of Study.

The University offers the following general courses of instruction:

- A.—A classical course, leading to the degree of A. B.
- B.—A course in letters leading to the degree A. B.
- C.—A science course, leading to the degree of B. S.
- D.—A pre-medical course, leading to the degree of B. S.
- E.—A course in mechanical engineering, leading to the degree of B. S. in Engineering.

The work of the year is divided into equal semesters. One hour's work is one hour recitation or lecture through one semester, with the required preparation. Two and one-half hours of laboratory work, shop work, or drawing counts the same as one of the lecture or of recitation. At least one hundred and thirty hours as here defined are required for graduation. A student's choice of elective work is subject to the approval of the Faculty, which reserves the right of refusing to give any elective course for which there are less than three approved applicants.

ADMISSION TO COLLEGIATE COURSES.

Candidates for admission to the freshman class in any of the collegiate courses of the University, must be at least sixteen years old and present evidences of good moral character.

Students coming from other colleges and universities must bring certificates of honorable dismissal.

Admission may be made:

(a)—By certificate.

1. Graduates of the accredited high schools of Montana are admitted to the collegiate departments of the University on presentation of their diplomas, accompanied by a certificate from the superintendent of their respective schools.

2. Students coming from any other school or college are requested to bring all grade cards, certificates or diplomas that they may possess, together with written statements from teachers, superintendents or principals, in order that a proper estimate may be made of their past work.

(b)—By examination.

Examinations for entrance will be given on days set in calendar of this catalogue.

Preparation is required or may be presented in the following subjects:

I. ALGEBRA.—Fundamental operations (including special rules for multiplication and division); Factoring; Highest Common Factor; Lowest Common Multiple; Equations of the First Degree containing one or more unknown quantities (including problems in the same); Involution and Evolution; Fractional and Negative Exponents; Radicals; Quadratic Equations of one or two unknown quantities. The equivalent of Chapters I—XVII, XIX and XX, of Wentworth's New School Algebra.

II. GEOMETRY, PLANE AND SOLID.—Demonstrations, construction and the solution of numerical problems involving the metric system and logarithms. The equivalent of Wentworth's text and Estill's Numerical Problems in Plane Geometry.

III. ENGLISH LANGUAGE AND LITERATURE.—

The requirements are:—

1. GRAMMAR.—A good knowledge of the elements of grammar, including the parts and properties of speech, the various kinds of sentences as to form and meaning, parsing, sentential analysis, and the classification of the elements of sentences.

2. COMPOSITION.—Ability to write clear and idiomatic English, and make practical use of the essentials of composition, not only form, construction, syntax and punctuation, but also the principles of good style and rhetorical figures.

3. LITERATURE.—Applicants will be expected to be familiar with the form and substance of the works in group (a), and to possess a general knowledge of the subject matter in two or more of the classics in group (b).

(a) Shakespeare's *Macbeth*, *Merchant of Venice* and *Julius Caesar*, Macaulay's *Essay on Milton* or *Essay on Addison*, Tennyson's *Idylls of the King* and *Princess*, Gayley's *Classic Myths*.

(b) Scott's *Kenilworth* or *Ivanhoe*, DeQuincy's *Revolt of the Tartars*, Eliot's *Silas Marner*, Dicken's *Tale of Two Cities* or *David Copperfield*, Wallace's *Ben Hur*, Blackmore's *Lorna Doone*, Kingsley's *Westward Ho!*

IV. HISTORY.—ANCIENT HISTORY.—The equivalent of one year's work, with special reference to Greece and Rome.

V. HISTORY.—MEDIAEVAL AND MODERN HISTORY.—The equivalent of one year's work.

VI. PHYSICS.—One year of Elementary Physics, the equivalent of Carhart and Chute's Elementary Physics, Gage's Principles of Physics, or Avery's Elements, one-half of the time having been devoted to laboratory work. The student's note book in laboratory practice will be considered evidence of having done this work.

VII. LATIN.—The reading of four books of Caesar, and four orations of Cicero, or their equivalents, with the grammatical knowledge which must be acquired in the preparation for and performance in a thorough manner of this reading. Practice in writing Latin to the extent presented in Bennett's or Jones' Latin Composition or similar works. This amount is usually covered by three years work.

VIII. GERMAN.—Grammar, Joyne's Meissner, Whitney's or their equivalents. Ability to read easy prose fluently, and to translate at sight such work as "Hauff's Maerchen" (Goold).

IX. FRENCH.—Grammar, Chardennal's Complete, Edgren's or their equivalents. Ability to read easy prose fluently and to translate at sight such work as "La Pierre de Touche" (Harper).

X. BIOLOGY.—One year's work in Biological Science, with half the time given to Laboratory work, the equivalent of Davenport's Elementary Zoology for class, and Kingsley or Colton in Laboratory, with accompanying special reading or study.

XI. CHEMISTRY.—One year's work, the equivalent of Remsen's Beginning Course. One-half of the time must be given to laboratory work, as certified by student's note book.

XII. PHYSICAL GEOGRAPHY.—One-half year, the equivalent of Tarr's Elementary Physical Geography.

XIII. PHYSIOLOGY.—A half year. Martin's Human Body, Briefer Course, or its equivalent, with laboratory work representing a minimum of 5 hours of work.

XIV. MECHANICAL DRAWING AND SHOP WORK.—One year.

REQUIRED FOR ADMISSION.

The subjects required for admission to the various courses are as follows:

Classical Course, I, II, III, IV, V, VI and VII.

Scientific Course, I, II, III, IV or V, VI, X or XI. Two years study of either ancient or modern languages, and one of IV, X, XII and XIII.

Literary Course, I, II, III, IV, V, VI, VII. For VII, wholly or in part, the student may substitute two years of Modern Languages and one year of Science.

Mechanical Engineering Course, I, II, III, IV, V, VI, VII, with any one of the following: For VII, wholly or in part, may be substituted an equivalent amount of VIII, IX, X, XI, XII, XIII, XIV.

Graduation and Degrees.

In order to secure the recommendation of the Faculty for graduation from the University in any of the respective lines of work that have been outlined, it is necessary for the student to complete the equivalent of at least one hundred and thirty hours work, as already defined in the section concerning collegiate courses.

That the needs and special inclinations of the different students may be consulted as far as possible, certain of these hours are required for each of the respective degrees and the rest are left for the student's selection.

The work required for the completion of the three courses in the College of Letters and Science shows at a glance the difference in the courses. Certain subjects are required of all students, others are required in special courses, others must be elected from definite lines of work and still others are free electives. It is understood that the choice in free electives must in part be governed by the arrangement of subjects on the daily program, and that precedence will always be given to required work for the different degrees and the number of partial elective hours allowed.

Special students in the Department of Education will select a major and two related minor subjects. At least half and not more than two-thirds of their work must be done in these three departments.

GENERAL WORK REQUIRED FOR DEGREES, EXCEPTING B. S. IN ENGINEERING.

Rhetoric, I.....	4 hours
Political Economy, I.....	3 hours
Psychology, I.....	5 hours
Literature.....	7 hours
Biology, I, II.....	8 hours
Chemistry, I, II.....	8 hours
Elocution, I, II.....	4 hours
History, I.....	3 hours
Library Science.....	1 hour
Physical Culture.....	2 hours
General required work.....	45 hours

WORK REQUIRED FOR DEGREE B. A. (Classical Group.)

General required work (given above).....	45 hours
Special required work, Latin.....	24 hours
Special required work, Greek Life.....	3 hours
Special required work, Roman Life.....	3 hours
Partial Electives, in Greek, Latin, Modern Languages.....	22 hours
Partial Elective, Trigonometry or Higher Algebra.....	4 hours
Free Electives.....	29 hours
Total	130 hours

(Literary Group.)

General required work (given above).....	45 hours
Partial Electives, Ancient and Modern Languages.....	22 hours
Partial Electives, History, Literature and Philosophy.....	32 hours
Partial Electives, Trigonometry or Higher Algebra.....	4 hours
Free Electives.....	27 hours
Total	130 hours

(Pedagogical Group.)

General required work (given above).....	45 hours
Latin and Greek.....	28 hours
Philosophy and Education.....	23 hours
Mathematics	4 hours
Restricted Electives.....	15 hours
Free Electives.....	15 hours
Total	130 hours

(Technical Chemistry Group.)

Physics, I and II.....	8 hours
Rhetoric, I.....	4 hours
Algebra (Higher).....	4 hours
Trigonometry	4 hours
German I and II.....	10 hours
Psychology	3 hours
Political Economy.....	3 hours
Literature	7 hours
Biology, I and II.....	8 hours

Chemistry:—

I, II, Inorganic.....	8 hours
III, Qualitative Analysis.....	8 hours
IV, VI, Quantitative Analysis.....	8 hours
VII, VIII, IX, X, Organic Chemistry.....	8 hours
XI, XII, Physical Chemistry.....	6 hours
XIII, Electro Chemistry.....	4 hours
XVIII, Inorganic Preparations.....	4 hours
Journal Club (No credit).....	1 hour
V, Assaying.....	3 hours
Industrial Chemistry or Water Analysis.....	2 hours
Mineralogy	4 hours

Advanced Mathematics:—

Calculus	8 hours
Analytic Geometry.....	5 hours

Mechanical Engineering:—

Mechanical Drawing.....	4 hours
Descriptive Geometry.....	4 hours
Analytic Mechanics.....	4 hours
Machine Design.....	2 hours
Electrical Machinery.....	3 hours

The above group constitutes the first four years of a course in Chemical Engineering. Students who are preparing for work as Analytical Chemists or Teachers may substitute for the Advanced Mathematics and Mechanical Engineering, the following:

Partial Electives in Chemistry, Geology, Biology, Mathematics or Engineering	10 hours
Free electives.....	12 hours

FOR THE DEGREE OF B. S. IN MECHANICAL ENGINEERING.

In Mathematics, I, II, III, IV, V.....	20 hours
Physics, I, II.....	8 hours
Political Economy, I.....	3 hours
German, I, II.....	10 hours
Chemistry, I, II, XII.....	11 hours
Literature	4 hours

For the technical work required in the Mechanical Engineering course see tabular statement, page 80.

WORK REQUIRED FOR DEGREE OF B. S. IN ENGINEERING.

In Mathematics, I, II, III, IV, V.....	20 hours
Physics, I, II.....	8 hours
Chemistry, I, II, V, XIII.....	14 hours
Literature, II.....	2 hours
Library, I.....	1 hour
English, I.....	4 hours
Physical Culture.....	2 hours

For the technical work required in the School of Mechanical Engineering see the tabular statement, page 80.

BACCALAUREATE DEGREES.

The University grants the following baccalaureate degrees for undergraduate work:

I. The degree of Bachelor of Arts to those who complete either the Classical group or the Literary group in the College of Liberal Arts.

II. The degree of Bachelor of Science to those who complete the Scientific course.

III. The degree of Bachelor of Science in Mechanical Engineering to those who complete the course in Mechanical Engineering.

ADVANCED DEGREES.

Master of Arts, Master of Science. The Degree of Master of Arts or Master of Science, will be conferred upon resident graduates on the following conditions:

I. The candidate must be a graduate of this University, or a University or College of good standing, as approved by the faculty.

II. He must have pursued, during one or more years, a course of graduate study at this University, the minimum requirement of work being represented by forty hours of credit.

III. The candidate may pursue one major study and two minors, one major and one minor, or may devote his entire time to the major, the division of time and arrangement of work to receive the recommendation of the department in which the major work is taken and the approval of the faculty. In any case one-half of the candidate's work must be on the major subject.

IV. The minor, or minors, must be closely allied to the major subject, provided, however, that any candidate, in residence for two or more years, may select any approved subject as a second minor for a degree.

V. All courses of study leading to advanced degrees are subject to approval, first, by the head of the department of the University in which the major subject for each student belongs; second, by the faculty. The signatures of the heads of the departments in which chosen minor subjects belong must also be obtained. This list of studies with the approval signatures must be deposited with the secretary of the faculty. No changes may subsequently be made except under the same line of approvals, but extension of time may be arranged with the professors concerned.

VI. He must submit a thesis showing marked attainment in some

branch of learning. The subject of the thesis must be announced to the faculty for approval, not later than the second Friday in December, and the thesis itself must be presented to the examining committee at a date to be set by the professor in charge of the thesis work, not later, in any case, than May 20th of the year in which the degree is expected.

VII. He must, at the close of his course, pass a satisfactory examination, either oral or written, or both, conducted by a committee which shall consist of three professors, selected by the faculty for this purpose.

VIII. The degree of Master of Arts will be conferred only upon the completion of a course mainly literary in character, and the degree of Master of Science upon one mainly scientific. The degree of Mechanical Engineer will be conferred on those holding the degree B. M. E. on the same conditions as in the other courses.

IX. Graduate students pursuing courses for the Master's degree may by special permission of the faculty, carry on a portion of the work in absentia; but at least one-half the work must be done in residence.

Scheme of Courses Offered by the University.

*These courses are the general requirements for college courses.

**Technical courses in Engineering.

Roman numerals indicate the number of the course; Arabic indicate the number of recitations per week.

ENGLISH AND RHETORIC.

FIRST SEMESTER.	SECOND SEMESTER.
*Elementary Rhetoric, I. 4.	Description and Exposition, II. 2.
Argumentation and Persuasion, III. 2.	Narration, IV. 2.
Versification, V. 2.	Prose, VI. 2.
Old English, VII. 2.	Ballads, X. 2.
History of the English Language, IX. 2.	Middle English, VIII. 2.
	Thesis, XII. 2.

LITERATURE.

Literature, I. 2.	Literature, II. 5.
Literature, III. 2.	Literature, IV. 5.
Literature, V. 5.	Literature, VI. 3.
Literature, VII. 5.	Literature, VIII. 2.
Literature, IX.	Literature, X.
	Literature, XII. 2.

ELOCUTION AND PHYSICAL CULTURE.

*Elocution, I. 2.	*Elocution, II. 2.
Elocution, III. 3.	Elocution, IV. 2.
Oration and Debate. 2.	Sight Reading. 2.
*Physical Culture. 2.	*Physical Culture. 2.

LATIN.

Latin, I. Virgil. 5.	Roman Life, VII. 4.
Latin, III. Horace and Cicero's Es- says. 5.	Latin, IV. Livy and Tacitus. 5.
Latin, V. Comedy. 2.	Latin, II. Virgil. 5.
	Latin, VI. Comedy. 2.

GREEK.

Greek, I. Grammar and Lessons. 5.	Greek, II. Anabasis. 5.
Greek, III. Anabasis. 5.	Greek, IV. Iliad. 5.
Greek, V. Odyssey, Herodotus, Thucy- dides. 5.	Greek, VI. Plato, Demosthenes. 5.
Greek, VII. Dramatists. 5.	
Private Life of the Greeks, IX. 3.	

GERMAN.

German, I. Becker—Grammar. 5.	German, II. Same. Carruth Reader. 5.
Grammar, III. Bernhard—Composition, Conversation. 3.	German, IV. Wilhelm Tell. Composi- tion and Conversation. 3.
German, V. Schiller's Wallenstein— Conversation and Composition. 3.	German, VI. Faust. 3.
	Deutsche Lit. Geschichte. Conversation and Composition. Aus dem Reich Friedrichs des Grossen. .

FRENCH.

French, I. Chardenal's Complete Gram- mar. 5.	French, II. Chardenal's Complete Grammar.
French, II. Napoleon. L'Abbe Con- stantin. 3.	Contes, Daudet. 3.
French, V. Histoire de la Lit. Fran- caise. Composition and Conver- sation. 2.	French, IV. Colomba. 3.
	Racine— Esther. Athalie.
	French, VI. Modern Writers and Classics. Composition and Conver- sation. 2.

SPANISH.

FIRST SEMESTER.	SECOND SEMESTER.
Spanish, I. Schilling's Spanish Gram- mar. 3.	Spanish II. Same. 3.
Spanish, III. Same.	Spanish, IV. Modern Writers. 3.
La Vida es Sueno. 3.	Spanish, VI. Cervantes. 3.
El si de las Ninas. 3.	
Spanish, V. Ruy Blas. 3.	

CHEMISTRY.

FIRST SEMESTER.	SECOND SEMESTER.
*General Inorganic, I. 4. Qualitative Analysis, III. 5. Introductory Quantitative Analysis, IV. 4. Mineral Analysis, VI. 4. Organic Chemistry, VII. 2. Organic Preparations, IX. 2. Physical Chemistry, XI. 3. Electro Chemistry, XIII. 4. Industrial Chemistry, XV. 3. Gas Analysis, XVI. 2. Organic Analysis. Inorganic Preparations, XVIII. 4. Physiological Chemistry, XX. 4. Sanitary Water Analysis, XXII. 2 or 4. Mineral Water Analysis, XXIII. 4. Photography, XXIV. Research, XXV. 4 to 20.	*General Inorganic, II. 4. Qualitative Analysis, III. b. 4. Introductory Quantitative Analysis, IV. 4. Assaying, V. 3. Mineral Analysis, VI. 4. Organic Chemistry, VIII. 2. Organic Preparations, X. 2. Physical Chemistry, XII. Metallurgy, XIV. 3. Gas Analysis, XVI. 2. Organic Analysis. Inorganic Preparations, XIX. 4. Physiological Chemistry, XXI. 4. Sanitary Water Analysis, XXII. 2 or 4. Mineral Water Analysis, XXIII. 4. Research, XXV. 4 to 20.

PHYSICS.

FIRST SEMESTER.	SECOND SEMESTER.
Physics, I. 4 hours. Physics, III. Electrical Measurements, 3 hours. Physics, V. Light, 2 hours. Physics, VI. Heat, 2 hours. Physics, VII. Special, 2 or 4 hours.	Physics, II. 4 hours. Physics, IV. Advanced. Experimental Physics, 2 or 4 hours. Physics, V. Light, 2 hours. Physics, VI. Heat, 2 hours. Physics, VII. Special, 2 or 4 hours.

GEOLOGY AND MINERALOGY.

FIRST SEMESTER.	SECOND SEMESTER.
General Geology, I. 4 hours. Mineralogy, III. 2 or 4 hours. Lithology, IV. 2 or 4 hours. Paleontology, IX. 2 or 4 hours. Economic Geology, V. 2 or 4 hours. Petrography, VII. 2 or 4 hours. Advanced Geology, VIII. 2 or 4 hours. Special Work, X. Physical Geography, XI. 4 hours. Organic Evolution, XIII. 2 hours.	General Geology, II. 4 hours. Mineralogy, III. 2 or 4 hours. Lithology, IV. 2 or 4 hours. Paleontology, IX. 2 or 4 hours. Blow-Pipe Analysis, VI. 2 or 4 hours. Advanced Geology, VIII. 2 or 4 hours. Special Work, X. Ores, XII. 4 hours. Graduate Work.

BIOLOGY.

FIRST SEMESTER.	SECOND SEMESTER.
*Biology, I. 4. Tu. and Th. at 10:30; laboratory, 1:30 to 4, two afternoons. Biology, III. Zoology of Invertebrates, 4. Tu. and Th. at 8:30 laboratory at hours to be arranged. Biology, V. Botany, 4. Recitation and laboratory at hours to be arranged. Biology, VII. Organic Evolution, 2. Tu. and Th. at 11:30. Course IX. Bacteriology, 3. Tu. at 9:30; laboratory at hours to be arranged. Course XI. Research, 4 to 6. Tu. and Th. at 9:30 laboratory at hours to be arranged.	*Biology, II. 4. Tu. and Th. at 10:30; laboratory 1:30 to 4:00, two afternoons. Biology, IV. Zoology of Vertebrates, 4. Tu. and Th. at 8:30, laboratory at hours to be arranged. Biology, VI. Botany. Recitation and laboratory at hours to be arranged. Biology, VIII. Human Anatomy, 4. M., Tue., Th., Fri. at 11:30, laboratory hours to be arranged. Course X. Entomology, 3 or 5. Tu. and Th., 8:30; laboratory hours to be arranged. Course XI. Research, 4 to 6. Tu. and Th. at 9:30; laboratory at hours to be arranged.

MATHEMATICS.

FIRST SEMESTER.
 *Trigonometry, I. 4.
 Analytic Geometry, III. 5.
 Calculus, V. 3.
 Elective Geometry, VI. 1.
 Elective Geometry, VII. 1.
 Astronomy, IX. 2.

SECOND SEMESTER.
 Higher Algebra, II. 4.
 Calculus, IV. 5.
 Elective Geometry, VI. 1.
 Elective Geometry, VII. 1.
 Theory of Equations, VIII. 3.
 Geometry, X. 2.
 History of Mathematics, XI. 2.

DRAWING AND PAINTING.

Black and White Work, I. 2.
 Black and White Work, III. 2.
 Water Color Painting, V. 2.
 Water Color Painting, VII. 2.
 Oil Painting, IX. 2.
 Oil Painting, XI. 2.
 Design, XIII. 2.
 History of Painting, I. 2.
 History of Architecture, II. 2.

Black and White Work, II. 2.
 Black and White Work, IV. 2.
 Water Color Painting, VI. 2.
 Water Color Painting, VIII. 2.
 Oil Painting, X. 2.
 Oil Painting, XII. 2.
 Design, XIV. 2.
 History of Sculpture, III. 2.
 Artistic Anatomy, I. 2.

PHILOSOPHY AND EDUCATION.

*Introductory Psychology, I. 3.
 Experimental Psychology, III. 2.
 Genetic and Applied Psychology, V. 3.
 Organic Evolution, VII. 2.
 History of Education, I. 3.
 Psychological Seminary, VI. 2.
 Educational Classics, II. 2.
 History of Greek Philosophy, I. 3.
 Logic, I. 2.

Introductory Psychology, II. 3.
 Experimental Psychology, IV. 2.
 Educational Psychology, V. 3.
 Principles of Teaching, IV. 2.
 High School Pedagogy, III. 3.
 History of Modern Philosophy, IV. 3.
 Ethics, II. 2.

HISTORY AND ECONOMICS.

English History, I. 4.
 Ancient History, III. 4.
 Modern European History, V. 4.
 Modern Economics, II. 4.

American Constitution, II. 4.
 Mediaeval History, IV. 4.
 International Law, IV. 4.
 Elements of Political Economy, I. 4.

School of Mechanical Engineering.

Roman numerals indicate courses: Arabic, hours credit.

The courses in mechanical engineering are designed for students who wish to become professional engineers, or to engage in any of the lines of manufacture and construction allied to the mechanical industries.

The requirements for admission are given on page 71.

The requirements for graduation from this school with the degree of B. S. in Engineering Work, are set forth in the following scheme. The studies are explained in detail in the description of the Courses of Instruction.

FRESHMAN YEAR.

FIRST SEMESTER.
Trigonometry, I. 4.
Chemistry, I. 4.
Rhetoric, I. 4.
Mechanical Drawing, I. 2.
Shop Work, I. 3.

SECOND SEMESTER.
Higher Algebra, V. 4.
Chemistry, II. 4.
Lit. II. 2.
Mechanical Drawing, I. 3.
Shop Work, I. 3.
Library, I. 1.

SOPHOMORE YEAR.

Analytical Geometry, IV. 5.
Physics, I. 4.
Surveying, VI A. 3.
Desc. Geometry, II A. 2.
Field Work and Topography, VI B. 3.

Calculus, VII. 5.
Physics, II. 4.
Surveying, VI A. 3.
Desc. Geometry, II B. 2.
Shop Work, II. 3.

JUNIOR YEAR.

Integral Calculus, VI. 3.
Analytical Mec. I. 4.
Electro-Chemistry. 4.
Machine Design, IV. 2.
Graphic Statics. 2.
Least Squares, VII A. 2.

Differential Equations, VII B. 3.
Analytical Mec. I. 4.
Strength of Materials, VII. 3.
Kinematics, V. 3.
Steam Engine Design, V. 2.
Assaying. 2.

SENIOR YEAR.

Hydrodynamics, II. 3.
Thermodynamics, IV A. 3.
Kinematics, V. 3.
Alternating Currents, X. 4.
Electrical Laboratory, IX. 2.
Mechanical Laboratory, VIII. 2.

Hydraulics, III. 3.
Construction and Operation of Heat Engines, IV B. 2.
Alternating Current Machinery, X. 4.
Electrical Laboratory, IX. 2.
Steam Engine Testing, VIII. 2.
Thesis, XII. 4.

The Preparatory School.

The Preparatory Course covers a period of three years, outlined in semesters after the plan employed in the College Courses. It is expected students will take subjects in the order given.

Applicants for admission to the Preparatory Course should be at least fourteen years of age, and well grounded in the elements of an English education.

Admission may be made—

(a) By certificate.

(1) Certificates or certified statements from superintendents, or from any graded school of good standing, showing completion of 8th grade work will be accepted in lieu of examination.

(2) Teachers' certificates given by county superintendents will admit students to the Preparatory School without examination.

(3) Students are urged to bring when possible all record cards, certificates and diplomas, together with a written statement from superintendent, principal or teacher, on which the standing of the student is stated.

(b) By Examination.

Examinations in Arithmetic, Grammar, U. S. History, Reading, Spelling, and Geography will be given on days stated in the calendar of this catalogue.

Students entering the second semester will be furnished work by the organization of classes needed for this purpose.

Preparatory Departments of Instruction.

MATHEMATICS.

I. ELEMENTARY ALGEBRA.—First semester. 4. Unless admitted on certificate, applicants for admission to this course must pass a satisfactory examination in Arithmetic. This examination will consist of an oral and a written test. Subjects covered will be Factoring, Common and Decimal Fractions, Percentage (including simple applications), elements of Involution and Evolution, and the Metric System.

II. ALGEBRA.—Continued. Second semester. 4.

III. GEOMETRY, PLANE.—First semester. 4.

IV. GEOMETRY, PLANE.—Second semester. 4.

V. ALGEBRA AND SOLID GEOMETRY.—First semester. 4.

VI. ALGEBRA AND SOLID GEOMETRY.—Second semester. 4.

Throughout the courses in Geometry much original work will be required. This original work will consist of demonstrations, constructions, and the solution of numerical problems involving the metric system and logarithms. In addition to the regular text, Estill's Numerical Problems in Plane Geometry, or its equivalent will be used.

ENGLISH.

The purpose of this work as pursued in the preparatory department is to enable the student to write English with creditable facility and to develop a taste for literature.

COMPOSITION.—Frequent written exercises, based on elementary texts. Elements of English grammar, and some literary models studied in connection with the work in composition.

LITERATURE.—The student is directed in the careful study of form, structure, and subject matter of the works included in list (a).

Written tests or papers will determine the value of the knowledge gained by the cursory reading of the works included in list (b).

(a). For Critical Study:—

First Year.—Longfellow's *Tales of a Wayside Inn*, Bryant's *Sella and Other Poems*, selections from Irving's *Sketch Book*, Scott's *Lady of the Lake*, selections from the *Old English Ballads*.

Second Year.—Webster's *Bunker Hill Oration*, Franklin's *Poor Richard's Almanac*, Lincoln's *Gettysburg Speech*, Hawthorne's *Snow Image* and *House of Seven Gables*, Schurz's *Lincoln*, Taylor's *Lars and Views Afoot*, Irving's *Life of Goldsmith*. Watkin's *American Literature* used as a guide.

Third Year.—Addison's *De Coverly Papers*, Macauley's *Essay on Addison*, Shakespeare's *Merchant of Venice*, *Julius Caesar*, and *Macbeth*, Byron's *Prisoner of Chillon*, Tennyson's *Idylls of the King* and *Princess*, Gayley's *Classic Myths*. Brooke's *English Literature* used as a guide.

(b). For Home Reading (Two or more assigned each semester):—

First Year.—Irving's *Alhambra*, Stevenson's *Treasure Island*, Hughes's *Tom Brown's School Days*, Warner's *Being a Boy*, Kipling's *The Jungle Books*, Lamb's *Tales From Shakespeare*, Seton's *Wild Animals I Have Known*, Pyle's *Adventures of Robin Hood*, Craik's *The Little Lame Prince*.

Second Year.—The *Man Without a Country*, Cooper's *Last of the Mohicans*, Alcott's *An Old Fashioned Girl*, Warner's *A-Hunting of the Deer*, Hawthorne's *Marble Faun*, Franklin's *Autobiography*, Lanier's *The Boy's King Arthur*, or *Knightly Legends*, Jackson's *Ramona*, Aldrich's *Marjorie Daw*, Allen's *The Choir Invisible*, Churchill's *The Crisis*.

Third Year.—Scott's *Kenilworth* or *Ivanhoe*, DeQuincy's *Revolt of the Tartars*, Eliot's *Silas Marner*, Dicken's *Tale of Two Cities* or *David Copperfield*, Wallace's *Ben Hur*, Blackmore's *Lorna Doone*, Kingsley's *Westward Ho!*

SCIENCE.

PHYSICS, I and II. A year's work in Elementary Physics, required of all students. The text of Carhart and Chute will be used. Two rec-

tations per week, five hours of laboratory work. Each student works individually the experiments, and records the results, with drawings, in a note book, which is submitted from time to time for examination. A good equipment of material is supplied, and every facility will be offered to produce the most successful work.

BIOLOGY. I. and II. Students preparing for Scientific Course must present a year of Biology, or in its stead a year of Chemistry. At present Biology alone is taught in the preparatory. This comes the first year, and consists of two recitations per week and two laboratory practices of two and one-half hours each. Special attention is given to manipulation of material, to the formation of correct habits of work and study, and to the development of the powers of observation. The students receive instruction from the professor of Biology, and work under the same conditions and surroundings as the college students. Much collateral reading is given from time to time. Davenport's Zoology was used the past year in class recitations.

LATIN.

The following general remarks are here made to avoid unnecessary repetitions under courses outlined below:

1. The Roman pronunciation will be used. Pains will be taken to form habits of correct pronunciation. In this connection, the points to be especially emphasized are that long vowels shall be pronounced as long; also that every consonant shall be distinctly enunciated. For preparatory work it is very desirable to use texts which have long vowels marked.

2. Bennett's grammar will be used and pupils are expected to master the elements of Latin grammar, at least as presented in the coarse print of this book.

3. In the preparation of pupils for the University courses, teachers throughout the state are earnestly requested to take pains to form habits of correct pronunciation; and to have almost daily some exercise in reading and translating at sight and in writing Latin. The importance of these points can scarcely be overestimated.

FIRST YEAR—

A First Year Latin Book Completed, comprising a complete presentation of regular forms, and the principal rules of syntax, with reading and composition for the application of these forms and rules.

SECOND YEAR—

Selections from Caesar.

The equivalent of four books of Caesar will usually be read.

Throughout the year lessons in Grammar and Composition will accompany the reading.

THIRD YEAR—

Cicero's Orations and Letters, composition exercises, and grammatical drill.

Five orations and some letters of Cicero will usually be read.

GERMAN.

Two years of German will be given in the Preparatory Classes.

FIRST YEAR—

Will be devoted to a thorough study of Grammar (Joyne's, Meissner or Whitney's) with some easy prose reading, such as Hauff's Maerchen or Carruth's Reader.

SECOND YEAR—

Study of Syntax, dictation, and prose reading, such as Schiller's "Der Neffe als Onkel."

If students having finished this work wish to elect German in college they may begin with Course III as shown on page 31.

HISTORY.

The aim is to give the student a general survey of history, and to teach him to grasp the relations and significance of events, rather than to memorize dates and facts. As the library of the University contains many excellent reference books the work is carried on by the library method to a considerable extent.

FIRST YEAR—

The work deals principally with Greek and Roman history. Myers's Ancient History, Revised Edition, is the text used.

Recitation, third hour, four times per week.

SECOND YEAR—

The second year is given to the study of Mediaeval and Modern history. Myers's Mediaeval and Modern History, Revised Edition, is the text used. Abstracts on historical themes are required from time to time.

Recitation, second hour, four times per week.

FREE-HAND DRAWING.

Two years of Free-Hand Drawing are required of all preparatory students. Two and a half hours once a week are devoted to the work.

COURSE I.—

1. Drawing in outline and light and shade from geometric solids.
2. Drawing in outline from single pieces of furniture, and from the interior of rooms.
3. Elementary principles of perspective.
4. Simple exercises in design.
5. Drawing in light and shade from still life.
6. Outdoor sketching.
7. Sketching from the pose.

Thursday, 1:30 to 4:00.

COURSE II.—

1. Drawing in charcoal from the cast.
2. Drawing in sepia from the interior of rooms.
3. Drawing in pen and ink.
4. Elementary designing in leather.
5. Introduction to water color painting.
6. Outdoor sketching.
7. Sketching from the pose.

Wednesday, 1:30 to 4:00.

MECHANICAL DRAWING AND SHOP WORK.

Preparatory students intending to enter the School of Mechanical Engineering may take work in Mechanical Drawing and Shop Work, four hours per week, equally divided between drawing room and shop.

MECHANICAL DRAWING.—In the first year, instruction is given in the use and care of instruments, lettering and drawing from copy.

During the second year, drawing from copy is continued, and drawing from sketches of simple machine parts, with sections and complete dimensions.

SHOP WORK.—During the first year, a course of exercise in carpentry and wood turning is pursued, for the purpose of teaching the use of ordinary wood working tools, and the simpler processes of construction.

In the second year, work in the wood shop is continued, the student adding to his experience by making book shelves, cupboards, and similar pieces of work. A portion of the time may be given to pattern making and foundry practice.

Program of Studies.

REQUIRED HOURS.		ELECTIVE HOURS.	
Algebra	15	German	20
Geometry	15	Latin	30
English Composition	20	Biology	10
Literature	10	Mechanical Drawing and Shop	
General History	16	Work	15
Physics	8		
Drawing	4		
Total.....	88		

Note 1.—The required hours must be taken in order to gain admission to any of the collegiate departments of the University.

Note 2.—In addition to the required subjects a student must take from the elective hours certain subjects determined by the collegiate course he wishes to follow.

1. For the Classical Course—Latin, 30.
2. For the Literary Course—Latin, 20 or 30; or German, 20, and Biology, 10.
3. For the Scientific Course—Biology, 10; German or Latin, 20.
4. For the Mechanical Engineering Course—Mechanical Drawing and Shop Work, 15; German, 15.

Accredited High Schools.

The State Board of Education in a meeting held June 1, 1896, took the following action:

"Candidates seeking admission to any of the regular courses in any state educational institution must be at least sixteen years of age and must possess a good moral character and good bodily health.

"Accredited Schools.—Any high school or academy whose course of instruction covers the branches requisite for admission to one or more of the courses of any state educational institution may be admitted to its accredited list of preparatory schools, after a satisfactory examination by a committee appointed by the State Board of Education. Application for such examination may be made by any school board to the Secretary of the State Board of Education, whereupon a committee appointed by the State Board of Examination will examine the course of study and methods of instruction of the school and on the committee's favorable recommendation, and the concurrence of the State Board of Education, it will be entered upon the accredited list of the state educational institution for which it applied. Any graduate of such an approved school will be received by the president of the state educational institution wherein said graduate is entitled to enter, on presentation of proper diploma and certificate from the superintendent of said school, into any of the courses of said institution for which said graduate has been fitted.

"Students of any accredited school who are not graduates must expect examinations as other candidates.

"A school once entered upon the accredited list will remain there until its administration is changed, or until notice is given by the State Board of Education of unsatisfactory results. Upon a change of administration application for continuation upon the list, if desired, must be made. If the work of the principal coming into charge has been recently examined in connection with some other school, a new examination may not be required, but such examination should in all cases be invited.

"Annual reports will be asked for by the State Board of Education from all accredited schools."

This legislation is still in force.

At the December meeting of the Board it appointed a committee "to formulate a uniform plan for accredited high schools." The committee met in Helena, December 28th, 1897, and formulated a plan, and a brief outline of work of accredited high schools, which was adopted at the next meeting of the State Board of Education.

"This committee decided to recommend to the Board that the work of the eight grades, when arranged, shall be the standard for entrance to the high schools."

This recommendation, which was adopted by the Board, became of effect in 1899, when the State Common School Course of Study was published and placed in the hands of schools boards, teachers and superintendents, and it still remains in force.

In June, 1899, the State Board of Education instructed the Diploma Committee to revise the Course of Study for accredited high schools. At the December meeting the committee asked for further time, which was granted. At the regular meeting of the Board in June, 1900, the Diploma Committee reported the following outline of work which was unanimously adopted.

Program of Studies. FOR ACCREDITED SCHOOLS.

<i>Classical Curriculum</i>	<i>Science Curriculum</i>	<i>English Curriculum</i>
Prepares for entrance to Classical Course, State University.	Prepares for all General Science Courses.	Prepares for all Technical Courses, and for the Normal School Professional Course.

FIRST YEAR.

Latin. English. Algebra. General History.	English. Algebra. General History. Physiology.	English. Algebra. Physiology. General History. Word Analysis.
Latin. English. Algebra. General History.	English. Algebra. Physical Geography. General History.	English. Algebra. Physical Geography. General History. Orthoepy and Phonics.

SECOND YEAR.

Latin. English. Algebra. General History.	German or Latin. English. Algebra. Botany or Zoology.	English. Algebra. Botany or Zoology. General History.
Latin. English. Plane Geometry. General History.	German or Latin. English. Plane Geometry. Botany or Zoology.	English. Plane Geometry. Botany or Zoology. General History.

THIRD YEAR.

Latin. English. Plane Geometry. Physics.	German or Latin. English. Plane Geometry. Physics.	English. Plane Geometry. Physics. U. S. History.
Latin. English. Solid Geometry. Physics.	German or Latin. English. Solid Geometry. Physics.	English. Solid Geometry. Physics. Arithmetic. Civics.

LIST OF ACCREDITED HIGH SCHOOLS.

City High Schools.

City.	Superintendent.
Anaconda	W. K. Dwyer
Billings	C. S. Brother
Butte	R. G. Young
Forsyth	H. Blair
Fort Benton	J. W. Lenning
Glendive	B. T. Butler
Great Falls	S. D. Largent
Hamilton	J. V. Owen
Helena	R. J. Condon
Missoula	J. G. McKay
Virginia City	E. V. Griffin

County High Schools.

County.		Principal.
Beaverhead	Dillon	L. R. Foote
Broadwater	Townsend.....	John M. Kay
Carbon	Red Lodge	E. H. Murray
Custer	Miles City.....	Edna Harris
Fergus	Lewistown.....	A. G. Greene
Flathead	Kalispell.....	G. A. Ketchum
Gallatin	Bozeman.....	George B. Swan
Granite	Philipsburg.....	G. T. Bramble
Jefferson	Boulder	Byron E. Toan
Park	Livingston	Lewis Terwilliger
Powell	Deer Lodge.....	E. T. Eaton
Sweet Grass	Big Timber	W. C. Ryan
Teton	Chouteau.....	A. B. Guthrie

Private Schools.....

Stevensville Training School	M. L. Roark
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LIST OF STUDENTS.

COLLEGIATE STUDENTS.

Emil Warren Adam.....	Sophomore, B. M. E.....	Big Timber
Ethel Ambrose.....	Literary...52.....	Missoula
Almeda Andrews.....	Classical...16.....	Missoula
Cora Averill.....	Classical...67.....	Townsend
Agnes Berry.....	Literary...56.....	Missoula
Marguerite Berry.....	Scientific...26.....	Missoula
Oral Berry.....	Scientific.....	Drummond
James Henry Bonner.....	Junior B. M. E.....	Missoula
Caron Lewis Bourdeau.....	Scientific.....	Missoula
Chas. Amos Buck.....	Sophomore B. M. E.....	Stevensville
Fred Buck.....	Senior B. M. E.....	Stevensville
Joseph Buckhouse.....	Senior B. M. E.....	Missoula
Nellie Cavette Bullard.....	Literary...51.....	Billings
Maud Burns.....	Literary...117.....	Missoula
Montana Buswell.....	Classical...21.....	Missoula
Robert Hart Cary.....	Scientific...34.....	North Platte, Neb.
Frank Christenson.....	Freshman B. M. E.....	Anaconda
George Coffey.....	Literary...5.....	Chouteau
Elmer Reed Corbin.....	Senior B. M. E.....	Missoula
Charles Patrick Cotter.....	Literary...53.....	Townsend
Vincent Stewart Craig....	Sophomore B. M. E.....	Missoula
Ida Cunningham.....	Literary...30.....	Missoula
Fréd Cumming.....	Literary.....	Helena
Arthur Davidson.....	Sophomore B. M. E.....	Anaconda
Helena Stone Davis.....	Classical.....	Washington, D. C.
Eugene Demers.....	Freshman B. M. E.....	Missoula
Regina Deschamps.....	Literary...15.....	Missoula
Alma Deschamps.....	Literary...24.....	Missoula
Homer Roswell Dewel....	Freshman B. M. E.....	Missoula
Charles Dimmick.....	Junior B. M. E.....	Missoula
Frederic Eugene Dion.....	Junior B. M. E.....	Glendive
Lem Dressback.....	Freshman B. M. E.....	Missoula
Stella Louise Duncan.....	Classical...82.....	Kalispell
Ethel Charlotte Evans.....	Literary...11.....	Missoula
Mary Potter Evans.....	Classical...114.....	Livingston
Charles Frederick Farmer..	Freshman B. M. E.....	Missoula
Thomas Joseph Farrell....	Scientific...89.....	Missoula
Linda Ellen Featherman....	Literary...85.....	Drummond
Margery Winnifred Feighner..	Literary...39.....	Missoula
Mary Monica Fergus.....	Literary...72.....	Whitehall
Phoebe Finley.....	Classical...27.....	Missoula
John Fisher.....	Sophomore B. M. E.....	St. Louis, Missouri
Edward Fitzgerald.....	Freshman B. M. E.....	Thompson
Ida Flagler.....	Classical.....	Missoula
Grace Serena Flynn.....	Classical...121.....	Orchard Homes
John Flynn.....	Classical...19.....	Orchard Homes

Jesse Fuller.....	Classical....32.....	Wallace, Idaho
William S. Fulton, U. S. A.....	Engineering.....	Fort Missoula
King Garlington.....	Scientific....98.....	Missoula
Susie Garlington.....	Classical....79.....	Missoula
Ralph Gilham.....	Scientific....66.....	Townsend
Helen Goddard.....	Classical....63.....	Billings
Lawrence Edward Goodbourn.....	Classical....93.....	Missoula
Warren Earl Greenough.....	Scientific....26.....	Missoula
Thomas Leo Greenough.....	Senior B. M. E.....	Missoula
Frederick Greenwood.....	Literary....18.....	Anaconda
Delbert I. Grush.....	Senior B. M. E.....	Hamilton
Edwin Gunner, U. S. A.....	Engineering.....	Fort Missoula
Edith Olive Hall.....	Classical....40.....	Basin
Mary Laura Hamilton.....	Literary....98.....	Rattlesnake
Floyd James Hardenburg.....	Scientific....109.....	Missoula
Carrie Elizabeth Hardenburg.....	Literary....53.....	Missoula
Ralph Harman.....	Literary....93.....	Kalispell
Fannie Hatheway.....	Classical....42.....	Missoula
Gilbert Joseph Heyfron.....	Literary....100.....	Missoula
Anna Hutter.....	Literary....76.....	Missoula
Florence Maud Johnson.....	Literary....119.....	Missoula
Elmer Reed Johnson.....	Scientific....70.....	Missoula
Maud Esther Johnson.....	Literary....108.....	Missoula
Frances E. Jones.....	Literary....47.....	Anaconda
John Davis Jones.....	Literary....120.....	Ovando
Daisy Kellogg.....	Literary....79.....	Missoula
Benjamin Kerlee.....	Freshman B. M. E.....	Darby
Berney F. Kitt.....	Freshman B. M. E.....	Missoula
Frank Lewis.....	Freshman B. M. E.....	Missoula
Charles Lillick.....	Freshman B. M. E.....	Missoula
Frederick Hewitt Linley.....	Freshman B. M. E.....	Missoula
Ralph Emerson Logan.....	Scientific....27.....	Stevensville
John Lucy.....	Scientific....36.....	Missoula
Agnes McBride.....	Literary....15.....	Superior
Elinor McCall.....	Classical....15.....	Missoula
Minta McCall.....	Classical....36.....	Big Timber
Harriet McCormick.....	Classical....17.....	Townsend
Ruby McDermott.....	Classical.....	Missoula
Herman McGregor.....	Sophomore B. M. E.....	Missoula
Jennie Angus McGregor.....	Classical....83.....	Missoula
John H. McLeod.....	Sophomore B. M. E.....	Butte
Roy D. McPhail.....	Literary....107.....	New Chicago
James Mills.....	Junior B. M. E.....	Deer Lodge
Josiah John Moore.....	Scientific....80.....	Anaconda
Fay Abernathy Murray.....	Literary....116.....	Missoula
May Elizabeth Murphy.....	Literary....39.....	Helena
Alma Lottie Myers.....	Classical....127.....	Lewistown
Mary Louise Napton.....	Literary....10.....	Missoula
Edith Nethery.....	Classical....10.....	Ord, Nebraska

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108

Frances Nuckolls.....	Literary....61.....	Butte
Ethel Orvis.....	Literary....10.....	Missoula
William Hovey Polleys.....	Junior B. M. E.....	Lincoln, Nebraska
Edna Crete Pratt.....	Literary....16.....	Missoula
Jessie Railsback.....	Literary....33.....	Billings
Mary Frances Rankin.....	Classical....16.....	Missoula
George Fred Rigby.....	Freshman B. M. E.....	Carlton
Josie May Robb.....	Classical....120.....	Hamilton
Isabel Louise Ronan.....	Literary....14.....	Missoula
Anabel Ross.....	Literary....86.....	Missoula
Zona Shull.....	Literary....30.....	Missoula
Lawrence Simpson.....	Scientific....10.....	Stevensville
Hugo Arnold Schule.....	Scientific....35.....	Chicago, Illinois
Carol Schreiner.....	Scientific.....	Iron Mountain
Ona Mansfield Sloane.....	Literary....113.....	Missoula
Helen Antoinette Smead.....	Literary....54.....	Missoula
William Smith.....	Freshman B. M. E.....	Martinsdale
Montgomery De Smith.....	Junior B. M. E.....	Hamilton
William Alonzo Sparks.....	Literary....48.....	Missoula
James Beryl Speer.....	Literary....44.....	Petoskey, Michigan
Thomas Claude Spaulding.....	Scientific....108.....	Missoula
Clarissa Eleanor Spencer.....	Literary....49.....	White Sulphur Springs
Joseph William Streit.....	Scientific....83.....	Fort Benton
Arthur William Stewart.....	Junior B. M. E.....	Butte
Margaret Summers.....	Literary....108.....	Corvallis
Florence Thieme.....	Classical....13.....	Marysville
Dillwyn Llewelyn Thomas.....	Freshman B. M. E.....	Butte
Allan Toole.....	Freshman B. M. E.....	Missoula
William Van Eman.....	Freshman B. M. E.....	Augusta
Frank J. Wallace.....	Freshman B. M. E.....	Missoula
Hazel Wallace.....	Classical....4.....	Missoula
Flora Albertine Ward.....	Literary....30.....	Missoula
Dale Ward.....	Literary....34.....	Hamilton
Ruth Ward.....	Literary....120.....	Hamilton
Lillian Warren.....	Classical....86.....	Orchard Homes
Debora Wagy.....	Literary....110.....	Victor
Victoria White Whitaker.....	Literary....47.....	Missoula
Roy Newton Whitesitt.....	Classical....34.....	Missoula
Essie May Whitesitt.....	Literary.....	Missoula
Isabel Juanita Wolfe.....	Classical....31.....	Lincoln, Nebraska
Alice Welch.....	Literary....75.....	Deer Lodge
Edward Wenger.....	Sophomore B. M. E.....	Anaconda
John Hart Willis.....	Scientific.....	Plains
Claude Lucius Willis.....	Scientific....8.....	Glasgow
Alice Ann Wright.....	Literary....16.....	Rattlesnake
James Yule.....	Sophomore Engineering.....	Missoula

SPECIAL STUDENTS.

Mrs. G. B. Austin.....	Music and Art.....	Missoula
Mildred Corbin.....	French.....	Missoula

Bernice McKnight.....	Kalispell
Thora Paulson.....	Elocution..... Missoula
Mrs. Katherine Sibley.....	French, German..... Missoula
Thomas Westby.....	Chemistry..... Missoula
Miss Mary Winslett.....	Photography..... Stevensville

IRREGULAR PREPARATORY.

Gertrude Gwendolin Rowland.....	Sand Point
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THIRD PREPARATORY.

Bess Margaret Bradford.....	Wagner, Indian Territory
Effie Cordz.....	Springfield, Mo.
Emma Cothlin.....	Missoula
James Dingwall.....	New Chicago
Mary Elrod.....	Missoula
Lauretta Granahan.....	*..... Iron Mountain
Ray Hamilton.....	Missoula
Robert Huckleberry.....	Billings
Henry Howell.....	Missoula
Edna Fox.....	Twin Bridges
David Lamar McClay.....	Lolo
Verres Morton McKnight.....	Kalispell
Uriel Murphy.....	Missoula
William Pipal.....	Wolf Point
Leverett Castle Rennick.....	Missoula
Edith Rolfe.....	Monarch
Lucia Ione Rolfe.....	Monarch
Helen Ross.....	Missoula
Claire Salisbury.....	Anaconda
Roberta Satterthwaite.....	Chicago, Illinois
Howard Toole.....	Missoula
Nellie Whitaker.....	Missoula
Mabel Wofford.....	Great Falls

SECOND PREPARATORY.

Edith Baker.....	Sanders
Mary Conlan.....	Missoula
Eugene Demers.....	Missoula
Mary Hansen.....	Missoula
Marshall Harnois.....	Butte
Arthur Hoffeditz.....	Anaconda
Lida Hurlbut.....	Missoula
Eugene Fisher.....	Lame Deer
Fred William Grant.....	Missoula
Alben Maurice Johnson.....	Thomas
Charles Johnson.....	Missoula
Herbert Joseph Mansolf.....	Missoula
John McBride.....	Missoula
Ruby McDermott.....	Missoula
Daniel McLeod.....	Butte
John McNamara.....	East Helena

Mabel Newport.....	Bonner
Herbert Rolfe.....	Monarch
Bessie Mae Russell.....	Clinton
Beatrice Sands.....	Missoula
Harry Schwartz.....	Helena
Earl Anton Schilling.....	Missoula
Beatrice Stillinger.....	Iron Mountain
Ralph Condon Stiff.....	Missoula
Frances Yule.....	Neihart

FIRST PREPARATORY.

Adolphus Bennett.....	Missoula
Herbert Bonhardt.....	Wien, Austria
Grace Corbin.....	Missoula
Roysdon Durnford.....	Carlton
Robert James Farnsworth.....	Fort Missoula
Paul Goodfellow.....	Ovando
Ralph Earl Herrick.....	Petosky, Michigan
Harold Hoepfner.....	Helmville
Marion Nevin.....	Big Timber
Paul Reim.....	Fallon
Leon Schwartz.....	Helena
Annette Pearl Shields.....	Missoula
Hoojiro Schinomyia.....	Nagasaki, Japan
Fred Ernest Thieme.....	Marysville
Warren Thieme.....	Marysville
Lucy Beatrice Webster.....	Missoula
Bessie Louise Willis.....	Glasgow

SUMMER SCHOOL.

Eugenia Berube.....	Helena
Marguerite Berry.....	Missoula
Nellie Bullard.....	Missoula
Irene Cave.....	Missoula
Emma Cothlin.....	Missoula
Emma Cole.....	Missoula
Florence Demers.....	Missoula
Mary Andelle Dwyer.....	Duluth, Minnesota
Bessie Epperson.....	Missoula
Grace Flynn.....	Missoula
Kate Lavina Goodman.....	Missoula
Della Haggerty.....	Butte
Eva Harrington.....	Townsend
Biden Hoar.....	Butte
Ethel Grace Hughes.....	Missoula
Clyde Kenyon.....	Seattle, Washington
John W. Lenning.....	Fort Benton
John M. Lucy.....	Missoula
Zona Marshall.....	Missoula
Florence Mathews.....	Missoula
John McDonald.....	Anaconda

Ruby McDermott.....	Missoula
Roy Daniel McPhail.....	New Chicago
Helen Meighan.....	Mankato, Minnesota
Katherine Moore.....	Missoula
Alma Myers.....	Missoula
Harriet Rankin.....	Missoula
Grace Rankin.....	Missoula
Bessie Ann Rhoades.....	Missoula
James Rhoades.....	Missoula
Isabel Ronan.....	Missoula
Raymond Small.....	Missoula
Mrs. Charles Smith.....	Iron Mountain
Charles Smith.....	Iron Mountain
Helen Edith Smith.....	Stockett, Washington
A. L. Speer.....	Missoula
Lizzie Sullivan.....	Stevensville
Valentine Troop.....	Missoula
Mary Williams.....	Port Huron, Michigan
Debora Wagy.....	Corvallis
Mary Weller.....	Missoula
Emily E. Walther.....	Berthold, North Dakota
Thomas Westby.....	Missoula
Nellie Whitaker.....	Missoula
Savilla Williams.....	Missoula
Isabel Wolfe.....	Lincoln, Nebraska
Alice Wright.....	Missoula

SCHOOL OF MUSIC.

Jeannette Anderson.	Florence Mathews.
Evaro Avery.	Mae Murphy.
Grace Corbin.	Alma Myers.
Alta Coleman.	Ethel Orvis.
Irene Cave.	Helen Orvis.
Anna Deschamps.	Mrs. Patton.
Linda Featherman.	Edna Rankin.
Edith Graham.	Mary Rankin.
Olive Hall.	Lulu Rathbon.
Miss Hackett.	Gladys Roberts.
Mildred Ingalls.	Clarissa Spencer.
Ruth James.	Zona Shull.
Bernice Kemp.	Beatrice Stillinger.
Gertrude Lynch.	Fannie Hatheway.

IN ATTENDANCE AT BIOLOGICAL STATION.

Nathaniel Alcock.....	De Kalb, Illinois
Thomas Bouser.....	Spokane, Wash.
Mrs. A. M. Burt.....	Jamestown, N. Dak.
Anna Carter.....	Missoula, Mont.
Mary Elrod.....	Missoula, Mont.

Chas. Fowler.....	Lewistown, Mont.
Curtis Greene.....	St. Paul, Minn.
R. F. Hollingsworth.....	Bigfork, Mont.
Helen James.....	St. Paul, Minn.
G. A. Ketcham.....	Kalispell, Mont.
Eloise Knowles.....	Missoula, Mont.
Arthur Lehman.....	Lewistown, Mont.
Gertrude Norton.....	East Helena, Mont.
Frances E. Sabin.....	Chicago, Ill.
Harry Scherf.....	Elizabeth, N. J.
F. A. Shuber.....	Livingston, Mont.
Mrs. F. A. Shuber.....	Livingston, Mont.
Sadie Shuber.....	Kalispell, Mont.
Perley Silloway.....	Lewistown, N. J.
Prof. J. S. Snoddy.....	Missoula, Mont.
W. A. Taylor.....	Chicago, Ill.
Mabel Ufford.....	New York City
Mary D. Womack.....	New York City

SUMMARY OF ENROLLMENT

	<i>men</i>	<i>women</i>	
Post Graduate.....	73	68	1
Collegiate	1	6	141
Special	0	1	7
Irregular Preparatory.....	9	14	1
Third Preparatory.....	15	10	23
Second Preparatory.....	13	5	25
First Preparatory.....	17	36	18
Summer School.....	0	27	47
School of Music.....	12	11	27
Biological Station.....			23
Grand Total.....	<u>134</u>	<u>179</u>	313
Counted Twice.....			24
Net Total.....			289

1905-06

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Register of the Alumni, University of Montana.

1898.

Mrs. Ella Robb Glenny, B. A.
Missoula, Montana.

Miss Eloise Knowles, B. Ph.,
Instructor in Drawing, University of Montana, Missoula, Montana.
1899.

Earl Douglass, M. S.,
Director Carnegie Museum, Pittsburg, Pennsylvania.

Zoe Bellew, B. A., M. A.,
Teacher in Missoula, Montana, Public Schools.

Anna Louise Hathaway, B. A., (Mrs. Wm. D. Harkins),
Missoula, Montana.

Helena McCrackin, B. A.,
Hamilton, Montana.

George Hempstead Kennett, B. S., M. D.,
Physician, Virginia City, Montana.

Charles Pixley, B. S., M. D.,
Physician, Missoula, Mont.

1900.

Eben Hugh Murray, B. A.,
Superintendent Public Schools, Red, Lodge, Montana.

Gertrude Buckhouse, B. S.,
Librarian, University of Montana, Missoula, Montana.

Caroline Harrington Conkrite, B. S.,
Teacher, Missoula, Montana, Public Schools.

Lu Knowles, B. S., (Mrs. Maxey),
Manila, Philippines.

Sidney Elery Walker, B. S., LL. B.,
Lawyer, Missoula, Montana.

Charles Earle Avery, B. Ph.,
Lawyer, Missoula, Montana.

Percy Shelley Rennick, B. A., M. D.,
Physician, Victor, Montana.

1901.

Sue Lewis, B. A.—(Mrs. Thompson),
St. Louis, Missouri.

Mary Lewis, B. A.,
Teacher, Missoula, Montana, Public Schools.

Estelle Bovee, B. Ph.,
County Superintendent Dawson County, Montana.

Bertha Simpson, B. Ph.,
Teacher, Missoula, Montana, Public Schools.

Sidney Mire Ward, B. Ph.,
Hamilton, Montana.

Kathryn Wilson, B. Ph.,
Seattle, Washington.

Hugh Graham, B. S.,
Eureka, California.

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133
8
17
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Lydia Jimmie Mills, B. S.,
Missoula, Montana.

George Cutler Westby, B. S., (M. E.),
Assayer, Salt Lake, Utah.

1902.

Helene Kennett, B. A. (Literary),
Missoula, Montana.

Fannie Maley, B. A. (Literary),
Teacher, Hamilton, Montana, Public Schools.

George Barnes, B. A. (Classical),
Rhodes Student, Oxford.

Helena La Caff, B. A., (Classical),
Florence, Montana.

Agnes McDonald, B. A., (Classical),
Teacher, Anaconda, Montana.

Helen McPhail, B. A., (Classical),
Teacher, New Chicago, Montana.

Katherine Ronan, B. A., (Classical),
Teacher, Butte, Montana, Public Schools.

Margaret Ronan, B. A., (Classical),
Teacher, Missoula, Montana, Public Schools.

Pearl Scott, B. A., (Classical),
Teacher, Philipsburg, Montana, High School.

Edith Watson, B. A., (Classical),
Teacher, Red Lodge, Montana, Public Schools.

William O. Craig, B. S.,
Deputy Clerk, Supreme Court, Helena, Montana.

Homer McDonald, B. S.,
Assayer, Great Falls, Montana.

Jeanette Rankin, B. S.,
Missoula, Montana.

Guy Sheridan, B. S.,
Assayer, Butte, Montana Reduction Works.

Benjamin Stewart, B. S.,
United States Topographical Survey.

Frederick Anderson, B. S., (M. E.),
Werdburg Engine Works, Milwaukee, Wisconsin.

Harold Blake, B. S.,
Machinist Draftsman, Washoe Smelter, Anaconda, Montana.

Grant McGregor, B. S.,
Power House Draftsman, Anaconda, Montana.

1903.

Mabel Jones, B. A., (Literary),
Teacher, Missoula, Montana.

Lillian F. Jordan, B. A., (Literary),
Glendive, Montana.

Rella Likes, B. A., (Literary),
Teacher, Frenchtown, Montana.

Lucy Likes, B. A., (Literary),
Teacher, Whitehall, Montana, Public Schools.

Claude O. Marcyes, B. A., (Literary),
Forsyth, Montana, Merchant.

Ida G. Rigby, (Deceased, February 19, 1904), B. A., Literary,
Carlton, Montana.

Mrs. Charles E. Avery, B. A., (Classical),
Missoula, Montana.

Miriam Hatheway, B. A., (Classical),
Missoula, Montana.

Harriet L. Rankin, B. A., (Classical),
Teacher, Missoula, Montana.

Martin, Jones, B. S.,
Teacher, Philippines.

Wellington Rankin, B. S.,
Student at Harvard.

Eloise Rigby, B. S.,
Teacher, Missoula, Montana.

Leslie Sheridan, B. S., (in M. E.),
Butte, Montana.

1904.

Walter Hammer, A. B., (Literary),
Teacher, Red Lodge, Montana.

Alice Herr, A. B., (Literary),
Bannack, Montana.

Georgia Evelyn Polleys, A. B., (Literary),
Lincoln, Nebraska.

Roxy Howell, A. B., (Classical),
Missoula, Montana.

George Greenwood, A. B., (Classical),
Banker, Anaconda, Montana.

Page Bunker, A. B., (Classical),
U. S. Survey, Ovando, Montana.

Moncure Cockrell, A. B., (Classical),
Graduate Student, Columbia University, N. Y.

1905.

Jessie Bishop, B. A., (Literary),
Teacher, Great Falls, Montana.

Anna Carter, B. S.,
Assistant in Preparatory Department, University of Montana.

William Oren Dickinson, B. S.,
Chemist, Butte, Montana.

Alice Gertrude Glancey, B. A., (Literary),
Teacher, Lewistown, Montana.

Herbert Hughes, B. S.,
Student, Chicago School of Pharmacy.

John Ray Haywood, B. S., (In Engineering),
Draftsman, Anaconda, Montana.

Avery Faulkner May, B. A., (Classical),
Music Teacher, Missoula, Montana.

Charles Edward Schoonover, B. A., (Classical),
On Forest Reserve, Ovando, Montana.

Frances Sibley, B. A., (Literary),
Instructor, Converse College, Decatur, Ga.

Charles Edward Simons, B. A., (Classical),
Merchant, Missoula, Montana.

Blanche May Simpson, B. A., (Literary),
Teacher, Corvallis, Montana.

Ray Epperson Walters, B. A., (Classical),
Miner, Mullan, Idaho.

Edward Williams, B. A., (Classical),
Graduate Student, Columbia University, New York.

HONORARY DEGREES CONFERRED.

1901.

United States Senator Thomas H. Carter, LL. D., Helena, Montana.

1902.

His Excellency, Jos. K. Toole, LL. D.,
Governor of Montana, Helena, Montana.

1904.

Judge Hiram Knowles, LL. D., U. S. Court, Helena, Montana.

Miscellaneous.

CONVOCATIONS.

All students are required to attend the regular weekly convocations which are held on Wednesday at 11:30 A. M. Special convocations may be held from time to time as the interests of the University demand.

SOCIETIES.

Two literary societies, the Hawthorne and Clarkia, are open to students. The first-named society is composed of young men and the second of young women. Both societies are alive and a credit to the University. Students attending the University will find membership in either of these societies most helpful and pleasant. The Athletic Association is well organized and has a large membership of both young men and women.

Branches of the Y. M. C. A. and of the Y. W. C. A. are organized, are prosperous and give promise of effective work along educational and social lines.

Two musical organizations are in existence, the University Glee Club composed of young men, and the University Orchestra. Both organizations are in a flourishing condition and have provided good music for University events during the year. These clubs furnish a splendid opportunity for all students who have musical talent to cultivate it as well as to participate in the social pleasures pertaining to such organizations.

Scholarships, Prizes, and Medals.

ACCREDITED HIGH SCHOOL SCHOLARSHIP.

Students, who hold the highest rank in the graduating classes of the accredited high schools of the state each year, are entitled to free scholarship in the University for four years.

BONNER SCHOLARSHIP.

Donated by Mrs. E. L. Bonner, of Missoula, Montana, in memory of her husband, Mr. E. L. Bonner. Open for the year 1905-06 to the competition of members of the first year class in the collegiate department. The one holding the highest rank will be entitled to all necessary expenses (about \$300 annually) for the remaining three years of his or her college course.

KEITH PRIZES IN DECLAMATION.

Donated annually by Mr. John M. Keith, of Missoula, Montana, for the best declamations by students in the preparatory department. The first prize is \$20; the second, \$10. The winner of the first prize in 1898 was Miss Nina Tibault. In 1899 the first prize was won by Gilbert Heyfron, and the second by William Dickinson. In 1900 the first prize was won by Laurens Lind Hechler, and the second by Washington J. McCormick. In 1901 the first prize was won by Elmer Woodman and the second by Mildred Corbin. In 1902 the first prize was won by Lillian Warren and the second by Lucia M. Mirriles. In 1903 the first prize was won by Blanche Ingalls and the second by Anna Hutter. In 1904 the first prize was won by Fern Healy and the second by Ethel Ambrose. In 1905 the first was won by Elois Ward, the second by Hart Willis.

BUCKLEY PRIZE IN ORATORY.

Founded by Doctor J. J. Buckley, of Missoula, Montana, in memory of his father, Mr. H. N. Buckley, and is awarded annually to any student in the University, competing under conditions subject to the control of the faculty. The amount of the prize is twenty dollars, derived from a permanent investment made to secure its endowment.

This prize was awarded in 1896 to Miss Anna Gray; in 1897 to Charles Pixley; in 1898 to Louise Hatheway; in 1899 to Guy H. Sheridan; in 1900 to Eben Hugh Murray; in 1901 to Kathryne Wilson; in 1902 to George E. Barnes; in 1903 to Corliss P. Hargraves; in 1904 to Gilbert J. Heyfron; in 1905 to Charles E. Simons.

ANNIE LEWIS JOYCE MEMORIAL MEDAL.

Founded by Attorney M. M. Joyce, of Missoula, Montana, in memory of his wife, and is awarded annually for the best essay, thesis, or poem by a member of the academic senior class, competing under the following conditions:

1. There must be at least two contestants.
2. No production shall contain more than 3,000 words.
3. Each production shall be type-written, shall be signed with a fictitious name, and shall be accompanied with a sealed envelope containing the real name of the writer and bearing the fictitious name on the outside.
4. All productions must be submitted, not later than 12 o'clock noon of the first Saturday in May to the president, who will, in turn, submit them to a committee appointed by the president, consisting of members of

the faculty. This committee shall have power to accept or reject any of the productions.

5. The productions that are accepted shall be submitted to another committee appointed by the president. This committee, after selecting the best production, shall submit the sealed envelope corresponding to this production to the secretary of the faculty, who shall, at the next regular faculty meeting, open the envelope in the presence of the faculty, and read the real name of the successful contestant.

6. The topic for the essay, thesis, or poem shall be announced in the catalogue, which is issued the year before the graduation of the contestants, so that they may have time during the summer for preliminary work on the topic assigned.

Topic for May, 1907: "Literature West of the Mississippi."

BENNETT PRIZE ESSAY.

Founded by Mr. Philo S. Bennett, of Bridgeport, Connecticut, who set aside by will \$10,000 to be distributed among twenty-five colleges or universities to be selected by Hon. W. J. Bryan of Lincoln, Nebraska. The amount of the endowment for the University of Montana is \$400, the annual proceeds of which will be given as a prize (in money or in a medal of equivalent value, at the option of the successful contestant) for the best essay by any student of the University, on some topic pertaining to good government. The conditions for the competition are the same as those governing the contestants who compete for the Annie Lewis Joyce Memorial Medal.

Topic for May 1907: An examination into the causes of large fortunes in this country.

COBBAN PRIZE IN GEOLOGY.

Given by Mr. R. M. Cobban of Missoula, Montana, to the student showing the best knowledge of geological subjects. Open to advanced students only. The amount of the prize is \$25.

THE 1904 CLASS PRIZE.

A prize donated by the members of the class of 1904, who, in rotation, name the particular excellence for which the prize shall be given. For the year 1904-05 it was awarded to the student holding the highest rank in the first year college class in Latin; for the year 1905-06, to the student representing the University in the state oratorical contest.

MUSIC MEDALS.

Two medals are given in the department of music: one by Mrs. Bonner for advanced piano technique; the other by Mrs. Blanche Whitaker for effort and proficiency.

THE STATE ORATORICAL ASSOCIATION.

This association was organized in 1900. The institutions represented are the Montana Wesleyan University, the Montana College of Agriculture and the Mechanic Arts and the University of Montana. The purpose of the association is to promote the interest of work along oratorical lines.

The contest in 1900 gave first place to Laurens Lind Hechler, the representative from the University, and that of 1901 gave first place to Mr. Farris, the representative from the College of Agriculture and Mechanic Arts. In 1902 the honors were won by George E. Barnes of the University, in 1903 by Corliss P. Hargraves of the University, in 1904 by Gilbert J. Heyfron of the University, and in 1905 by Mr. Williams of the Montana Wesleyan.

THE JOHN M. EVANS HALL.

Through the liberality of Hon. J. M. Evans and other citizens of Missoula, the Literary Society Hall has been elegantly furnished. The dedication was held March 18, 1900, and was attended by a large number of students and citizens.

Mr. Evans having taken the initiative in the effort to furnish the room, it was considered proper to name the hall after the principal donor and so it was christened the John M. Evans Hall.

THE UNIVERSITY SILVER CORNET AND ORCHESTRAL BAND.

The University is in possession of a full set of musical instruments which were donated by the Garden City Cornet Band.

A permanent organization has been effected and the band is doing some excellent work. The instruments are used on the same basis as other University material and are thus accessible to any who desire to take up this kind of work.

THE UNIVERSITY PAPER.

The Kaimin, through the effective efforts of its corps of editors, has become a permanent factor in the University life. The various difficulties, incident to the launching of a new enterprise, have been met, and the success of the University paper is assured.

The Board of Editors elected the past year was as follows:
Editor in Chief John D. Jones
Literary Editors Maud Burns, Joseph W. Streit

Local Editors	Montana Buswell, James H. Mills
Society Editor	Ralph Harmon
Exchange Editor	May Hamilton
Athletics Editor	Lawrence E. Goodbourn
Business Managers	Charles Cotter, Robert Cary
Circulating Manager	Hovey Polleys

THE WEATHER SERVICE.

On the departure of the 25th U. S. Infantry from Fort Missoula, the instruments belonging to the Weather Bureau were placed in the keeping of the University. The instruments consist of a set of maximum and minimum thermometers, a standard thermometer, instrument shelter and rain gauge. A pair of wet and dry bulb thermometers for determining the dew point has been added, and also a standard barometer of the Fortin pattern.

The records at Fort Missoula had been taken continuously for nineteen years. As the University is but four miles from the Fort in practically the same climatic conditions, the continuation of the observations is very desirable.

The work has been placed in charge of Prof. M. J. Elrod of the Department of Biology.

THE UNITED STATES GEOLOGICAL SURVEY.

A topographical map of a portion of the state having Missoula as the center has been prepared by the government. This region is later to be worked up geologically, and will be given in the series of geological maps now being issued by the U. S. Geological Survey. The University is aiding in this work in every way possible, and will be very much benefited by the results reached by the survey. At the present writing a bench mark for altitude has been placed in the stone at the left entrance to the main building, the altitude being 3,312 above sea level. This has now been corrected by the survey brought in from the Pacific Ocean whereby the corrected height of 3,323 feet is established. The triangulation party has established a bench mark on the campus, with stone piers marking the meridian line, giving the latitude and longitude accurately determined, and these marks will no doubt be starting points for future work.

ATHLETIC AND GYMNASIUM WORK.

A committee from the Faculty, entitled The Committee on Athletics and Gymnasium Work, has general oversight of the athletic sports and gymnasium. The details of the manage-

ment are in the hands of the Board of Directors of the Athletic Association. Regular gymnasium classes have been organized during the past year, one of young men and one of young ladies. The class of young men have exercises with the dumb bells, Indian clubs, punching bag, etc., together with seventeen "setting up" exercises and military drill. The class of young ladies are drilled with the dumb bells, Indian clubs, free arm exercises, wands and general calisthenics. This has been made possible by one of Missoula's citizens, Mr. C. H. McLeod, who has very kindly equipped the gymnasium with parallel and horizontal bars, trapeze and swinging rings, chest weight machines, and Whitely exerciser, vaulting horse, punching bag, boxing gloves, fencing foils, Indian clubs, dumb bells, wrist and finger machines, and a rowing machine. Besides these there are two small mats for the bars, and a large gymnasium rug, sixteen feet square, for wrestling and boxing. The athletic field, located in the northwest corner of the Campus is now in excellent condition. A quarter of a mile running track is nicely finished, and the entire field has been well scraped and leveled. Within this track there is located the base ball diamond and the foot ball field. To the south are the tennis courts.

The general sports indulged in are foot ball, basket ball and base ball, together with the indoor and out doors field sports.

The Faculty have established the following important regulations:

First. The foot ball season will extend from September 1st to Thanksgiving Day.

Second. Only bona fide students in the University, taking at least 12 hours per week of recitations or lectures can represent the University in any of its games with other college teams. Teams representing the University will not be permitted to play teams representing other schools or colleges unless the latter conform to the same requirement for study.

Third. At least four days before the departure of University teams to play with school and college teams elsewhere and also four days before games with such teams on the home grounds a list of the students from which names are to be selected for University teams, must be presented by managers to the Faculty for consideration and approval.

FEES AND DEPOSITS.

Preparatory, or any College Course, per year (Matriculation fee) payable at entrance	\$10.00
Athletic fee, per semester	1.00
Physical apparatus (deposit) per semester	3.00
Chemistry I and II—Chemical apparatus (deposit) per semester	6.00
Chemistry III—Qualitative apparatus (deposit) per semester	6.00
Chemistry IV—Quantitative apparatus (deposit) per semester	6.00
Chemistry V and VI—\$10.00; each additional hour.....	2.00
Chemistry IX and X—Organic Chemistry (deposit) per semester	10.00
Assaying apparatus (deposit) per semester	10.00
Deposit, Biological Laboratory, per semester	3.00
Deposit, Mechanical Engineering Laboratory, per semester	5.00
Photography	5.00

EXPENSES.

The Woman's Hall on the campus is a new building, well furnished, lighted and heated. Rooms for a single occupant may be rented at \$1.50 per week. If two persons occupy the same room the rate is \$1.25 each. Meals are furnished at the uniform price of \$4.25 per week.

Students not accommodated at the Hall are expected to find rooms and board in private families.

Good homes can thus be provided for all and at very reasonable rates. Expenses may be very materially lessened by the formation of boarding clubs. Students will not be allowed to board at places not approved by the Faculty.

EMPLOYMENT FOR STUDENTS.

A large number of the students of the University earn either the whole or a part of their expenses while in college. Students intending to work their way can usually do so if they come with sufficient means to support them for the first half year, though many have made all their expenses from the beginning.

Although the University cannot guarantee work for students, it is believed that those who are strong and willing to do any work that offers, will be able to pay their expenses, though this may result in lengthening the student's under graduate attendance to five years. A number of students find work about the

University: as stenographers, assistants in the laboratories or in the library, as carpenters, and in other capacities. Others find employment in town as clerks, reporters, janitors, newsboys, etc.

While nothing is more efficient in obtaining work than the personal endeavors of the student, a committee of the faculty will give every aid possible. Particular attention will be paid to the needs of new students, or those who are of themselves unable to secure employment. Those wishing employment during the coming year and new students wishing information, should send their names, together with an account of the work they have done, the character of the work they wish to do, and a list of the positions they would be willing to fill, to

W. D. HARKINS,

Chairman of the Committee on Student Employment,
Missoula, Montana.

UNIVERSITY SURROUNDINGS.

Missoula is located in Western Montana, on the main line of the Northern Pacific Railroad and at its junction with the Bitter Root valley and Coeur d'Alene branches, thus affording easy railroad connections with all parts of the State and the Northwest.

The City of Missoula is noted as being one of the most beautiful in the west; and is unexcelled as regards pure water, healthful surroundings, beautiful scenery, and all of those things that contribute to make life pleasant and agreeable.

Situated at the head of the Missoula valley and near the outlet of the Bitter Root valley, it is within the limits of the great agricultural and fruit growing regions of the state.

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